POPULAR AVIATION

December

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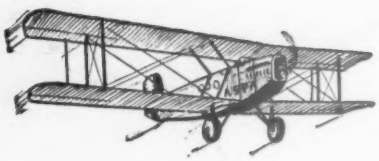

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POPULAR AVIATION

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A magazine for everyone interested in aviation progress and development

Volume 1 DECEMBER, 1927 Number 5

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Disagreement

ONE of the voices of the industry has come forward with the printed statement that in his opinion the aviation industry is limited in its field to some five or six thousand possible customers or prospects.

This is strongly reminiscent of the early days of the automobile, and the still more recent talk of the "saturation point" in the same field. Prophecy is such a dangerous thing that we hesitate to indulge in it for fear that in the years to come some one will rise up and quote us to our own confusion. "Oh that mine adversary would write a book," still holds good.

It does seem ridiculous to ignore the present conditions by taking no account, apparently, of the widespread interest in aviation as something more than a sport. If the contention is that the field is strictly limited to those already in the industry, and that none but the flyers of today are prospects for the ships that will be built tomorrow, a lot of earnest men with brains are making a serious mistake.

Business men are turning to the air as one solution of the problem of quick deliveries. Air transport ties in perfectly with the recent hand-to-mouth buying, and companies who pride themselves upon their service to the customer find it almost ideal for deliveries.

Other companies, none of them connected with the industry, find it the best form of transportation when it becomes necessary for high-salaried executives to travel. Waste time is cut to a minimum. Salesmen in territories that are far-flung have discovered a way to double their number of calls and consequently their sales.

Possible two hundred Aero Clubs have been formed in the past three months. These club members are not flyers—they merely hope to become flyers. But they have back of them the power of organization and the plane that was impossible for the individual becomes a reality for the club. These clubs are buying planes and hiring instructors.

Are all of these outside the picture?

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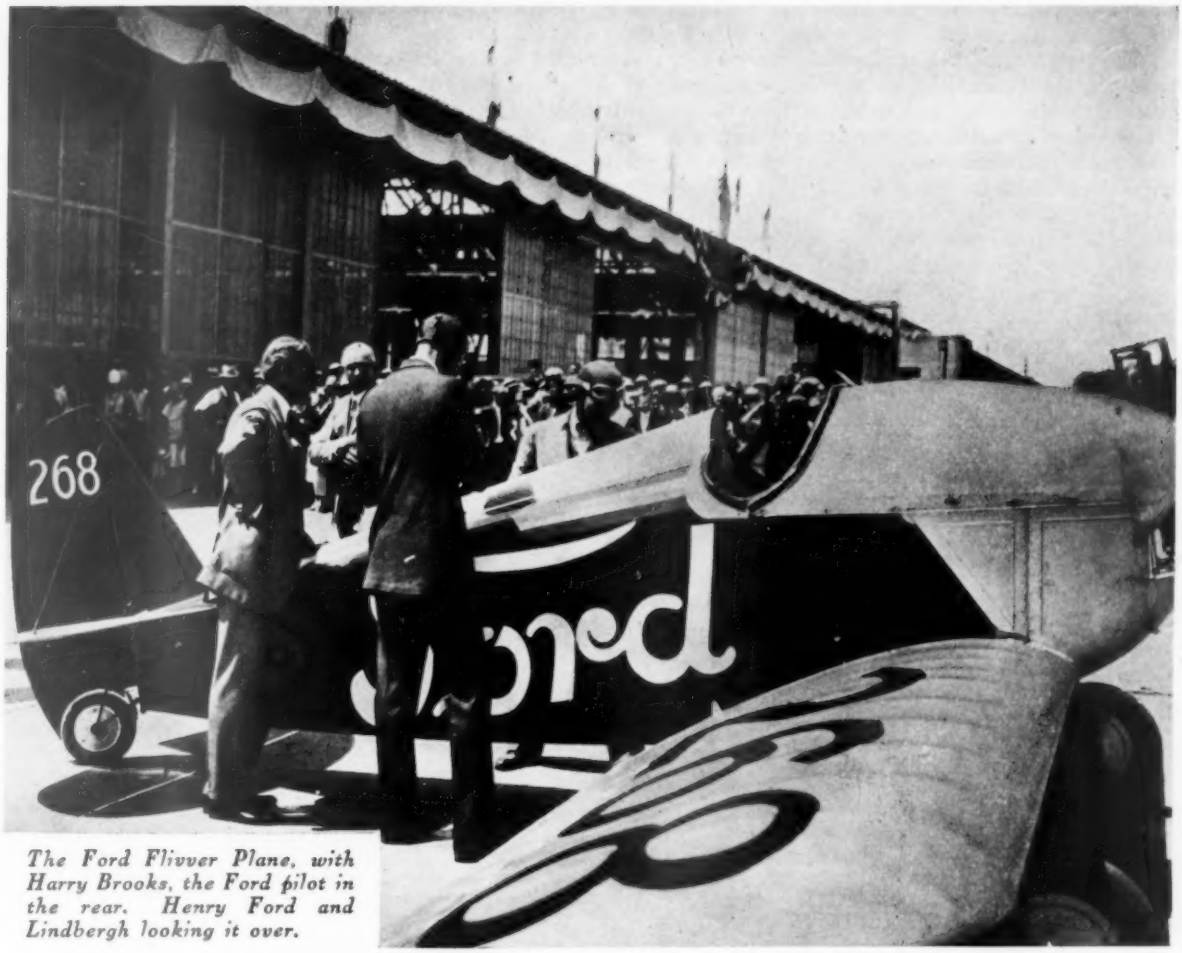

The Ford Flivver Plane, with Harry Brooks, the Ford pilot in the rear. Henry Ford and Lindbergh looking it over.

When Ford Went Up

By Russell Wilks

I AM addressing my remarks in behalf of aviation to the adults," said Col. Charles A. Lindbergh, on the platform at Northwestern Field, Detroit, where 50,000 people had gathered to pay tribute to him. "There is no need to speak to the younger generation on this subject, for the younger generation already is a flying one. The adults are the ones I want to sell."

These remarks were made on August 10. Twenty-four hours later Lindbergh made a sale which will become a part of history. He sold Henry Ford and Edsel Ford their first airplane flights. He sold them so thoroughly that they decided to take a second flight thirty minutes after the first flights were over.

Everyone wants to know what Ford is doing in aviation. Here are two of the first photographs of the Ford plane—a midget—but airworthy. As to production plans—you will have to ask Mr. Ford.

While Colonel Lindbergh was inspecting the Ford airport with the motor king on August 11 he invited the latter to ride with him in his famous Spirit of St. Louis, the Ryan monoplane with which he conquered the Atlantic in thirty three and a half hours.

"Mr. Ford," Colonel Lindbergh said, "I have never taken a passenger in my plane. I would like you to be the first to go with me."

Some time elapsed before Mr. Ford answered. During this interim Colonel Lindbergh put the clincher on his famous sale by flying one of Ford's experimental machines. He did not pilot the plane to prove to Mr. Ford how adept he was in the art of flying. He flew it because he wanted the pleasure of flying it and because he wanted to please the thousands who had managed to get into the airport or to find a place along the crowded thoroughfares leading thereto.

That flight, however, made a deep impression on Mr. Ford, just as it did on the other spectators. I am certain of this because I stood by the motor magnate and conversed with him

while Colonel Lindbergh was in the air. The remarks he made to me during the young aviator's flight prepared me in part for the startling announcement which he was to make soon.

The plane Colonel Lindbergh flew is known as the "Ford Flivver" plane. It was designed by Otto Kopping, 27-year-old engineer, and was revealed to the public by Mr. Ford on his sixty-third birthday, which was on July 31, 1926. The machine is still an experimental job. It had never been flown by anyone except Harry Brooks, Ford pilot.

Colonel Lindbergh strode out to the miniature mechanical bird and looked down on it as a Gulliver might a Lilliputian. Its wings measured only 20 feet from tip to tip and it weighed only 320 pounds. The gallant aviator towered like a Campanile over it but it was a plane and that was enough for him. He strapped on his headgear and forced his height into the cockpit. At best, his head and shoulders protruded awkwardly but there was nothing awkward in the manner in which he taxied down the field and hopped into the air.

William B. Mayo, chief engineer for Ford, watching Lindbergh "get set" for flying in the new Ford midget. Behind are Henry Ford, and (hidden by Lindbergh) Harry Brooks, Ford pilot.

He began climbing and soon the little machine appeared as a silver mosquito in the sunshine which flooded the sky that day. Colonel Lindbergh was in a new plane and, naturally, refrained from spectacular stunts. These were unnecessary, for everyone realized a master was in the air. Spectators thrilled just to see him idle along, a style of flying in which he indulges with much enjoyment. They marvelled when he banked sharply. When he climbed, they climbed in unison to their toes. When he dipped, they dipped back on their heels.

In heart and soul the crowd was Colonel Lindbergh's. No, not Colonel Lindbergh's, but merely Lindy's, for they had known him as a youngster born only 25 years ago in Detroit, and he was still a youngster to them. Maybe they were swayed with the sentiment emanating from the triumphant return of a native son. The day before he had been given the most effusive reception any one man was ever accorded in Detroit. Men, women and children had sacrificed the day for him, just to get a look at him. Perhaps that spirit had carried over to the next day. It was Lindy in the air, their Lindy.

"That boy is a genius," Mr. Ford said to me, as he watched every move of the aviator's plane. "Look at him. Did you ever see such graceful flying? He certainly knows how to handle a plane. Why, he seems more at home in the air than on the ground. He flies as gracefully as any bird. You see, he knows planes through and through.

"When he got into my plane he simply asked if the controls were standard. I told him they were. That was sufficient. You can see that for yourself. I am greatly impressed with his flying. I am also impressed with him as a gentleman. I have never had a guest whom I enjoyed entertaining more than I have Lindbergh. Here he comes down now."

Although I noticed that Mr. Ford following the flight with extreme interest, I did not know at the time what was going on in his mind. No one knew. Mr. Ford was pondering over that invitation. He was wondering if he should break the vow he had repeatedly made—that he would never fly.

As Colonel Lindbergh alighted, we walked out toward the plane. Suddenly Mr. Ford stopped. He turned to me and whispered his startling announcement.

"Lindbergh is right," the manufacturer said. "He says the adults are the ones who must be sold on flying. I am going up with him."

The announcement came with a suddenness characteristic of the world's richest citizen. He had made up his mind. The Lone Eagle had sold him. Orders were given on the field and everything became a hustle and bustle. The crowd did not anticipate what was to take place. The Spirit of St. Louis was brought from the hangar. A special seat was placed in the small cockpit. Mr. Ford placed a headgear over his slightly wavy gray hair and climbed in. Lindbergh followed. They were off.

At the age of 63 the man who had carefully refrained from airplane flights was at last in the air. The crowd cheered as Ford got into the plane. They were seeing the world's first billionaire taking his first flight. Subconsciously they knew in that moment of excitement that his trip would exert a tremendous influence on air travel. They sensed that the confidence planted by Colonel Lindbergh when he made his epic flight from New York to Paris would take deeper root in the public mind as result of Henry Ford's first flight. They knew that others, some felt that they themselves, would soon be emulating the Croesus of the Twentieth Century. Again they cheered when the plane landed.

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"How did you enjoy it?" I asked Mr. Ford, as he stepped out of the plane, following a ten-minute flight over the airport and vicinity.

"It was great," he said. He revealed no sign of nervousness after getting out of the plane.

"How would you like to take a flight every day?" I inquired.

"Oh, I don't suppose I'll do that, but I wouldn't mind," he laughed.

The conversation was interrupted at this point by Edsel Ford, who announced he was going to take his first flight, also with the flying colonel. He climbed into the Spirit of St. Louis and took the seat his father had just left. For a similar length of time he was in the air. He was all smiles when the ride was over.

"I enjoyed every minute of it," he said.

"Well, let's get a party and go up in one of our own ships," suggested his father, getting thoroughly into the flying spirit which prevailed at the airport.

At this suggestion a huge tri-motor, Ford, all-metal transport was brought out and made ready for a flight which was to be bathed in fame. It was a monster ship with a wing spread of 70 feet and with motors developing 600 horse-power. It weighed more than two tons. As I looked upon it I could easily picture the air pullman which the Ford organization has announced it will build within the next year. It has considered building air liners to carry 100 passengers and to be driven by six 1,000-horse-power motors.

Colonel Lindbergh and Harry Brooks went to the control room. The passengers started toward the plane. I had not been invited, but the thought of riding in an airplane which was to carry the world's wealthiest citizen and was to be piloted by that noble youth who linked the United States and France with an unforgettable solo flight made me bury all reserve.

"Mr. Ford," I said, "I would like to make this trip with you."

I had only known him a half hour. All I could expect was a courteous refusal and all I could hope for was a most unusual fate. My hope was not in vain. Mr. Ford showed as much interest in obtaining a seat for me as if we had been friends of years' standing. After three conferences with William B. Mayo, his chief engineer, who was organizing the party, he told me I could go.

Thus it was I had the honor of being the only newspaperman given permission to make the trip and the first one to obtain an aerial interview from America's outstanding genius of industry. Thus it was that I had the added pleasure and distinction of interviewing Colonel Lindbergh in the air. Thus it was I made my first airplane flight.

Lindbergh says goodbye to Edsel Ford. Major Thomas G. Lanphier, commandant of Selfridge Field, in flying togs.

I was glad that it was my maiden flight because I knew I could compare my sensations as they came with those experienced by Mr. Ford. We were in the same ship, so to speak, because his first flight had not lasted long enough for him to feel he was a perfectly initiated traveler of the air.

Our flight was for a period of 40 minutes. During those minutes I had the opportunity of observing and conversing with Mr. Ford as no one ever had. We passed over his various plants in Detroit. We circled over the principal sites of the city. We flew over the Detroit River and the Canadian shore.

The trip as a whole probably was best described by him when he said: "Why, this is just like a picnic."

That was the way it seemed. In the luxurious passenger cabin everyone laughed and joked as though they were in the smoker of a Pullman. The party was comprised principally of Ford officials. Major Thomas G. Lanphier, commandant at Selfridge Field, also went along as a passenger.

"There is nothing to it," said Mr. Ford, referring to flying. "It is simple. I haven't the slightest feeling of uneasiness. We are safe up here. I feel just as safe here as I do on the ground."

"It seems to me that every now and then we take a little dip as though we were going down unexpectedly," I remarked.

"Those are air bumps," Mr. Ford explained, giving me the benefit of his first flight experience a few minutes before. "You see, those bumps are encountered more over a city than in other places on account of the heat arising from the city.

"With their exception I can hardly tell we are moving. It seems to me that we are not moving but that it is the ground that moves. It seems to pass back of us. I am not aware of speed. This is the finest ride I ever had."

Mr. Ford undoubtedly was very comfortable, for in no way did he display uneasiness. He smiled and chatted in the same easy manner he had done while we were standing on the ground. Occasionally he would reach across the aisle, touch my arm and point out things below.

"There are some of the ships we

have been scrapping," he said, pointing out the window. "I never dreamed that I would look down on my enterprises from away up here. They certainly look differently. So small. There's my River Rouge plant, I have seen air views of it but this is the real stuff, isn't it? Look over here. That is the Highland Park plant. Well, this surely gives one a new viewpoint."

By this time Mr. Ford had come to feel so much at home in the air that he decided to go into the control room, where Brooks and Colonel Lindbergh had been alternately piloting the big transport. The young aviator gave his seat to Mr. Ford, who took hold of one of the two control wheels. He made no attempt to pilot the plane but sat and watched Brooks maneuver it.

Meanwhile, Colonel Lindbergh came back to the passenger cabin.

"How do you like flying this ship?" I asked him.

"Well, it is very easy to operate, but, of course, it is not my plane." His reply revealed his love for the Spirit of St. Louis.

"This is a novel experience for me," he continued. "I am nearly always in the pilot's seat. I don't know how I would feel if I should miss a few flights a day. I have just figured up that during the last five and a half years I have averaged four flights a day. That is a good argument for safety, is it not?

"Flying is not a question of safety, any more. What we need now is an airport in every city. That is the way aviation will develop. Mr. Ford is doing an immeasurable amount of good for aviation. His airport is a splendid one. He is building planes, and today he is showing beyond all doubt his confidence in them.

"But we need municipal airports, too. Every city should provide one and operate it so it will encourage aviation. That is why I am touring the country under the auspices of the Guggenheim Foundation for the Promotion of Aeronautics. I make a plea for airports wherever I go.

"Some day my plane is to be placed in the Smithsonian Institute, but I don't want that day to come until I have carried the message of aviation to all parts of the country. I feel I am doing more good by touring the country with the plane than I would if I put it in a museum now.

"When it goes away for good I am sure I shall remember there are plenty more planes I can get and there are many miles left in me."

While Colonel Lindbergh was in Detroit his plane was kept on display in a hangar at the Ford airport. The bashful boy aviator was at different times the guest of the Fords, Major Lamphier, and his mother, Mrs. Evangeline Lodge Lindbergh, a Detroit school teacher.

Mr. Ford returned from the control room as happy as a boy with a new toy. The renowned manufacturer is always happy in the midst of machinery.

"I think that flying is still 90 per cent man," he told me, "But we have two mighty good men along with us. I mean Lindbergh and Brooks.

No one knows what large scale production will mean to the aircraft business. It is certain that the active interest of a manufacturer like Mr. Ford in the mass production of aircraft will have an effect that will be far reaching. If Mr. Ford carries his ideas out until, as he says, air travel is comparable with automobile travel, we will need air traffic stop and go lights.

"What we must do is to make it more machine and less man. That is what I am devoting a lot of my time and interests to. I expect to continue experimenting and building planes until air travel is comparable with automobile travel today."

"Is that little midget plane that Colonel Lindbergh flew the kind you are going to manufacture for individuals to use?" I asked.

"That will come later on," he replied.

Edsel Ford, seated just behind his father, plainly enjoyed the trip as much as any experience he had had in a long while. Never did the least expression of concern creep over his face.

"How are you enjoying the flight?" I asked him.

"This is fine," he said. "I feel very much as I thought I would. It is to me like riding in a boat. I have always been a good seaman, so I did not expect any unpleasantness up here.

"This is the best way of seeing the city I have found. It beats worrying yourself in the congested traffic on the ground."

And, indeed, this mode of travel was vastly superior to that of the automobile in the streets of the city because we were flying at the rate of 100 miles an hour. Our altitude ranged from 2,000 to 3,000 feet. It seemed we had been in the air only a few minutes when Mr. Ford informed me we were getting ready to land at the airport.

All along I had been thinking about the landing. I had heard so much said about how easy it was to go up but how difficult it was to come down properly that I looked on the landing as the climax of the flight. Gradually we began lowering.

"See," said Mr. Ford, "it comes down just as easy as it went up."

And so it did.

New Transport Company

C. V. Eakin, Northwest representative of the Pickwick Stages, Inc., has been elected president of the newly organized West Coast Aerial Transport Company, which will commence operations on December 1st.

The machines to be used on this new coast route will be manufactured by the Bach company of Los Angeles, and will be equiped with three Wright J-5 motors capable of developing a speed of 125 miles an hour.

Other officers of the new transport company are Bert Wren, secretary; Mrs. Mary Bollam, general passenger agent; John Hutson, in charge of express. Wren and Mrs. Bollam are officers of the Pickwick stages and Hutson is manager of the Oregon Motor Stages, Inc. However, the new line will have no connection with the Pickwick organization, the officers having been chosen only for their knowledge of coast traffic conditions.

The first service will be between Portland and Seattle with two round trips daily. Portland to San Francisco will be the next line and later the service will be extended to Los Angeles. At present the Rankin flying field will be used. Rates for express are set at 50c a pound and passenger fare equivalent of railroad plus Pullman.

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Women Flyers Meet at Sea

A TOUCH of interest was added to the last "ocean-hop" stunt, by the fact that the passenger, Ruth Elder, hoped to be the first woman to cross the Atlantic by air. With her plane wrecked and at the bottom of the Atlantic Fate made her meet, in the Azores, another woman with the same ambition, Mlle. Lilli Dillenz, Vienna actress, who had come that far from Germany in the D-1230.

On October 12th the Stinson-Detroiter "American Girl," powered with a Wright J-5C engine, took off from Roosevelt field with George Haldeman as pilot. Haldeman had taught Ruth Elder to fly and they had put on stunts through Florida at county fairs and carnivals. Miss Elder surprised even her friends, who knew her flying ability, by the easy passing of her license tests. Haldeman, former army instructor during the war, ranking as captain, left the Army in 1919 and went into the air reserve. Since that time he has spent much time in the air and has made a study of navigation and meteorology.

Business men of Lakeland, Florida, the home town of both Miss Elder and Haldeman, were interested in the project. They succeeded in interesting men in Wheeling, W. Va., and between the two groups sufficient money was raised to finance the trip.

Nothing need to added to all that has been written about ocean flights. There are flights and flights, and we can but hope that next year will see a calmer consideration of the problem presented by ocean obstacles. Much is to be learned about ocean air curents and weather conditions, so that future flights may have at least a reasonable chance of success.

Prior to the start of the trip Dr. James Kimball, weather bureau meteorologist, had issued a statement warning aviators that conditions were decidedly against continued good flying weather in October. Good weather would undoubtedly be found over certain sections of the Atlantic but the chance of normal flying weather for the whole trip was quite slim, as storm areas were constantly increasing.

After the first few hours of the flight weather conditions grew rapidly worse and it was found impossible to climb high enough to get out of the storm zone. Heavy sleet, freezing on the wings, became a problem, and for eight hours, spelling each other at the controls, the two fought their way across the Atlantic.

When the storm abated they found themselves uncertain of their position. Flying ahead, fearing every minute that they would have to alight on the water, they discovered a Dutch tanker, the Barendrecht. They were aware that they did not have sufficient gasoline to reach Europe, so they circled about the ship and signalled distress. Then they dropped on the water near the ship and awaited rescue.

The "American Girl" was wrecked in the sea-landing, and for some unaccountable reason, possibly gasoline from a broken supply line, caught fire shortly after Haldeman and Miss Elder were taken off. The fire made it impossible for the tanker to salvage the plane so it was left to sink.

Meanwhile the waiting public at the radios in many homes over the United States had received no news and it was feared that two other names would

Captain George Haldeman and Ruth Elder, co-pilots of "The American Girl."

have to be added to the casualty roll for the season. The plane was long overdue on the Continent, and many had given up hope when the tanker reported the rescue. On October 15th the two flyers were landed at Horta, Fayal Island, in the Azores.

Robbed of her first opportunity to be the first woman to fly the Atlantic Miss Elder continued her journey to Paris, by way of Lisbon, Portugal.

At Horta Miss Elder met Mlle. Lilli Dillenz, who was there awaiting for favorable weather to resume her flight to the United States as a passenger in the Junkers plane D-1230. The plane had left Germany under favorable weather conditions but severe storms had delayed it in one port after another. On October 14, while Horta was making preparations to greet the rescued Americans, the Junkers plane, piloted by Fritz Loose, arrived from Lisbon, Portugal. The 1,100 mile trip had been made without incident, but the weather conditions were getting progressively worse. The landing was made in rough water and in a drenching rain.

Bad weather continued to delay the start of the D-1230 from the Azores to Newfoundland. However, the German flyers are not trying for a record, but are merely blazing the way for a regular service that a group of German financiers think feasible. The same group financed the start, October 12th, of another seaplane, the D-1220, constructed by Dr. Ernest Heinkel, a well-known German designer.

The pilot of the latest contender for the honor of the east to west crossing of the Atlantic, is Horst Mertz, a test pilot for the Dornier company at Frederichshaven. The mechanic is Carl Rhode, a former employee of the Packard company, which brings out the interesting fact that the D-1220 is powered with a Packard engine. Rhode served in the American army, and went to Warnemunde, Germany, to install the Packard engine, when it was decided to substitute it for the German engine first used in the plane.

The Junkers D-1230 on its way to the United States via the Azores. It is a tri-motored craft and is carrying a crew of four and one passenger.

Store Sells Rides

Recognizing the great strides in aviation and the general eagerness of the public for a joy ride in the air, the William Filene's Sons Company of Boston, one of the largest ready-to-wear department stores in the world has added the booking of airplane rides over Boston to the list of the many services provided by its famous Personal Service Bureau. Opportunity is also afforded employees of the store to take these trips at a slight discount from the regular passenger rate.

The air service is provided by Air Service of New England, Inc., which has appointed the Filene Company its booking agent. This is the first store in New England to book airplane passages for its customers. If the customer has a charge account at the store the amount may be charged on the customer's monthly bill. The regular price for a flight covering a twenty mile flight over Boson, is five dollars, and the flight lasts twenty to thirty minutes. Every Saturday and Sunday, at the East Boston Airport, several hundred people are being taken up on these flights. A party of four is taken up at one time, in a cabin plane.

Winter Flying

By H. H. Arnold

IT is an unwritten law that the United States mail must get through to its destination regardless of weather conditions and the fact that some is carried by plane does not make it an exception to the rule. Last year the Air Mail Service on the trans-continental route averaged 93 per cent performance on its runs. Taking into consideration the high mountains, the long night flights and the difficult winter flying conditions everyone concedes that such results show highly efficient service. Every year the Pursuit Group of the United States Army Air Corps holds winter maneuvers in the extreme northern part of the Central States. In these maneuvers the planes carry out their missions on schedule the same as in other seasons of the year. The planes, however, are equipped with skis instead of wheels to permit of taking off and landing on snow and ice.

It is always difficult to start gasoline engines in cold weather and the average airplane engine is much harder to start under such conditions than an automobile engine. In the Air Corps, as in the U. S. Mail Servie, when a mission is not completed excuses are not accepted. The Mail Service has, at almost every station, heated hangars to make the starting of its engines easier. The temperature of the oil and water in the heated hangars remains constant throughout the year but with the Air Corps squadrons out on maneuvers and at stations where there are no heated hangars, winter flying is not so simple.

Various expedients are utilized and devices extemporized on maneuvers to secure hot water and oil and to heat up the engines so that the gasoline will volatize readily. As the operations are conducted under actual field conditions, none of the complicated paraphernalia ordinarily available at a regularly established airdrome is taken with them. Their airdromes are snow covered fields; their supplies are stacked on the ground and probably covered with ice and snow; the temperature may be several degrees below zero but the planes take the air on schedule.

In order to heat the water and oil, fires are lighted and cans of water and oil suspended over them. While hot water and oil are thus made available, the heat supplied will not materially raise the temperature of the six to eight hundred pounds of metal in the engine. In one of the first maneuvers the mechanics found that something must be done to heat the intake manifolds to facilitate the vaporization of the gasoline. One of the simplest of all known methods was tried out and found to be satisfactory. Large stones were placed in the fire. After being heated they were laid upon the intake manifolds. Thus the problem was solved and each succeeding year, before they left their home station, the mechanics ascertained that building bricks were included in the supplies

Tires are inflated by means of a portable tank of compressed air. Note the dolly supporting the plane's tail skid.

for sometimes it was difficult to find stones under the deep snow.

While the improvised methods outlined are the best that can be secured for troops in the field and suffice for a few days operations, they are hardly satisfactory for squadrons working during the winter at their home stations. At all Air Corps airdromes where heated hangars are not available and long hard winters are customary, devices of a permanent character have been evolved which permit of rapidity of service and efficiency of operation. Men working in extreme cold do not have the same dexterity as when working in mild weather. This is in part due to the heavy clothes which they must wear and accordingly, all servicing apparatus must be as simple in operation as possible.

When freezing weather is anticipated, all water is drained from the airplane radiators and the oil tanks are not filled when the planes are run into the hangars after flying is completed. Each airplane requires over 15 gallons of water so that a squadron operating 8 planes will need over 150 gallons of hot water before the next flights take place. Hot water is also needed for other purposes and the airplanes usually must all leave the ground at the same time hence it is essential that at least 200 gallons of hot water be available at all times. Furthermore a mission can not wait until the water is heated so the heating system must be constantly operated. A 500 gallon tank with a coal burning heater is part of the equipment of most stations and the fire in the heater is started with the first freeze and maintained throughout the winter. An underground pipe connects the boiler to a long hose coiled in an underground compartment at the edge of the flying field. This permits of the radiators on the planes being filled with little loss of time.

Ordinarily the oil tanks are not drained and only sufficient oil added to that in the tanks to bring the oil to the 15 gallon level. Airplane engines require much heavier oil than automobile engines and the cold heavy oil make it practically impossible to turn them over for starting. A couple of drums placed in the boiler room near the water heater furnishes oil with the chill taken off. The warm oil is taken to the planes in a 50 gallon tank mounted on wheels to make it portable. A hand pump and a hose are used to force the oil in the tanks on the plane. This portable tank is kept in the boiler room also.

Each field has a 750 gallon gasoline tank mounted on an automobile chassis. While such a large tank might seem excessive in size, the tanks of the modern airplanes will soon drain the truck tank if the planes come back empty. Each plane of the observation type has a gasoline tank capacity of about 170 gallons. As a rule these planes take off with from 90 to 120 gallons of gasoline aboard so that if eight planes are to be filled the tank truck will be empty before the job is completed. A hand pump mounted on the truck forces the gas into the planes. This pump throws about 1 gallon of gasoline for each turn of the handle. While this makes pumping easy it takes a large number of turns to fill a hundred gallon tank. The hose attached to the pump is long enough to permit the truck to stop well clear of the planes and thus eliminates any danger of damage to the plane by collision.

The airdromes have main storage tanks for gasoline with a capacity of from 10,000 to 20,000 gallons. These tanks are equipped with electric pumps so connected that they start working as soon as the valve at the delivery end of the pipe and hose is opened. In large gasoline tanks there is a certain amount of water resulting

Servicing airplanes with hot water. Underground compartment for storing hose visible in foreground.

from condensation and this is augmented from time to time by additional water added with each new supply of gasoline received. In order that this water will not be pumped out with the gas, the outlet pipes in the main storage tanks are arranged so that the last 300 or more gallons can not be pumped out. These main tanks are permanently installed underground with concrete structures over them. They have filling pipes of sufficient size and so located that they are filled by gravity.

Observation planes are equipped with tires of the 32x6 or 36x8 inch sizes of the balloon type. Compressed air is needed to keep these tires inflated just the same as automobile tires. An electric air compressor with a tank pressure capacity of about 250 lbs. is installed in a hangar for this purpose. As in commercial practice the compressor is automatically regulated so that the pump starts working when the pressure gets below a certain point and stops when the pressure in the tank reaches the 150 lb. point. However, higher pressure can be obtained if desired. Small two wheeled tanks with 100 lb. capacity are used to inflate the tires of the planes.

All servicing equipment must be capable of being readily supplied with oil, gas or air and also must be very mobile so that it can be placed close to a plane without danger of damaging it by bumping. Airplanes are clumsy things to move around on the ground and unlike the servicing of automobiles where the cars are driven to the service station, the service is brought to the plane at all well organized airdromes. In order to facilitate the handling of airplanes small two wheeled trucks called "dollies" are used to support the tail of the planes. The tail skid is placed in a small metal lined compartment, mounted in such a manner that it can turn around 360 degrees on a vertical axis. This permits the dolly to turn in any direction and thus give the airplane a certain flexibility of motion.

The flying suit is lined with fur, the boots with sheepskin and the helmet with chamois.

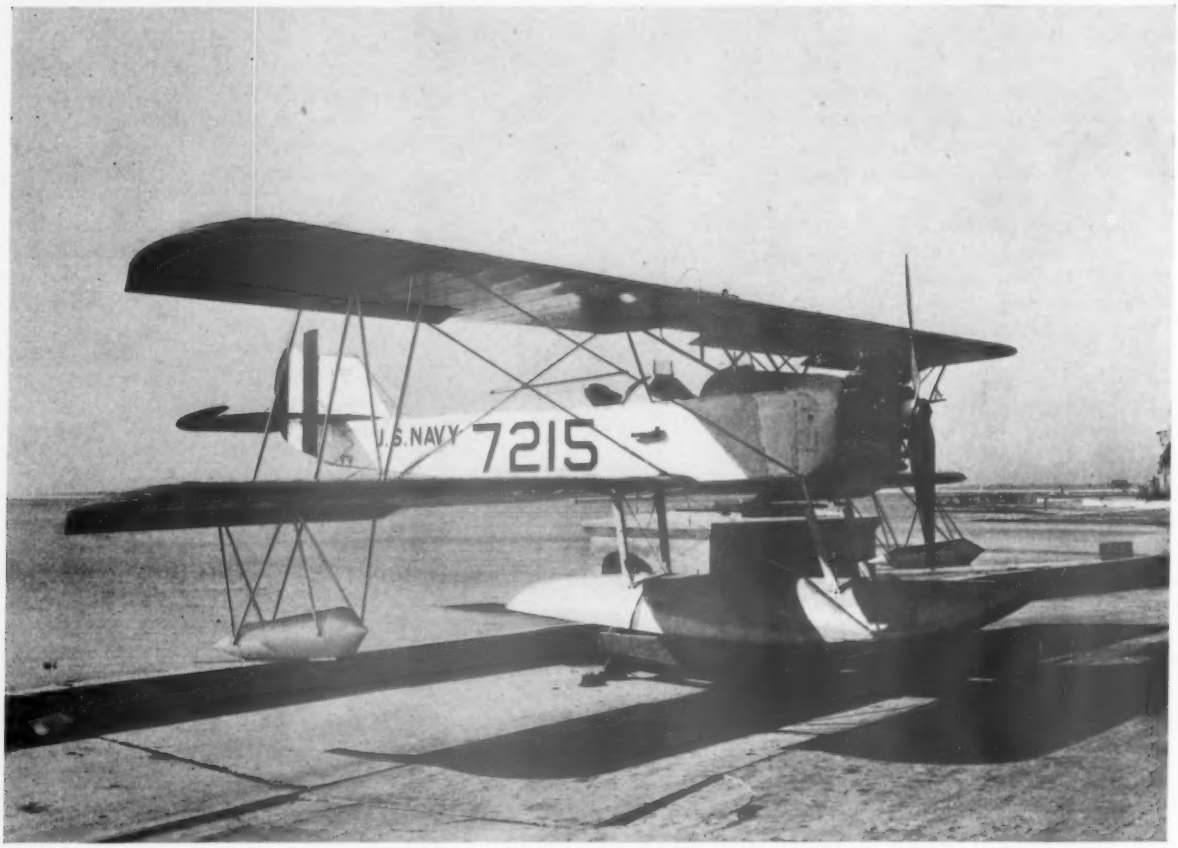
The winter clothing worn by pilots depends to a great extent upon the type of plane to be flown, the length and character of flight and the temperature on the day the flight is to be made. Ordinarily the pilot wears a sweater, muffler, fur lined one piece flying suit, helmet, goggles, fleece lined boots and fur gloves. If the cold is intense he will probably also wear a face mask. When the pilot has put on this clothing and then has strapped himself into his parachute he can do little better than walk with a decided waddle but once in the air he either finds himself very comfortable or else wishes that he had put more clothes on. On many occasions pilots have landed suffering from the intense cold in spite of their heavy clothing. There have been times when pilots have worn two flying suits, a blanket lined one or a knitted wool one, underneath the heavy fur lined suit and even then suffered from the cold.

Filling the oil tanks from the easily portable 50 gallon wheeled reservoir.

B. & M. Takes Notice

"The Boston & Maine railroad will keep abreast of the developments in commercial aviation, and it may be that at no distant date our passenger trains will be co-ordinated with scheduled airplane movements, as they are today with motor coach runs," is the statement just made public by President George Hannauer of the B & M system. This was in connection with his appointment of Vice President Gerrit Fort as chairman of a committee of railroads officials charged with the duty of considering air transportation as it affects the railroad.

Mr. Fort, as vice president in charge of traffic, had reported to President Hannauer on present trends in commercial flight with the recommendation that the Boston & Maine place itself in the forefront of American railroads in preparation for co-ordination of service by rail, highway and air as soon as air transportation can be justified on economic grounds. A pioneer among the railroads of the country in motor coach operation, the Boston & Maine now has 68 busses covering 1,000 route miles daily.



NY-1 training plane (Consolidated) with air cooled engine.

Naval Aviation Training

So many requests for information as the requirements for qualifying for naval aviation training followed the publication of "Earning Wings in the Navy" in the October issue of Popular Aviation, that it has been thought desirable to state definitely just what these qualifications are. This article is based on the information supplied by the Navy Department and is both up-to-date and authoritative.

THE United States has no separate Naval Air Service, Naval Aviation being an integral part of the Navy itself. Candidates for Naval Aviators are selected from three classes:

(1) Graduates of the Naval Academy at Annapolis, Md.
(2) Enlisted men in the U. S. Navy who may qualify.
(3) Civilians entering through the Naval Reserve.

There are no other persons qualified for this training.

In the first division, graduates of the Naval Academy may volunteer for flying duty. These candidates are required to pass a rigid flight physical examination, and on passing are sent to the Naval Air Station at Pensacola, Fla. On completion of this course the graduate is designated a Naval Aviator.

Enlisted men may qualify for a rating as Aviation Pilot, U. S. Navy. Enlisted men in the regular Naval Establishment, rated as Seamen, second class, or Firemen, third class, may request duty in connection with aviation. These requests may or may not be granted, depending on the number of new men required for aviation duties at the time. Those selected for flight training are sent to the Naval Air Station at Pensacola, Fla., and are given a course similar to that given the candidates for the rating, Naval Aviator. The course is not quite so extensive as it is planned to fit the Pilot to become a good, practical flyer without requiring the theoretical knowledge of all the subjects with which the Naval Aviator must be familiar. The candidates for Aviation Pilots are selected from among the enlisted men on aviation duty, who request flight training, who are under 28 years of age, and whose records indicate great proficiency in their ratings.

Enlisted men who become Aviation Pilots are not deprived from qualifying and becoming officers. They may be-

come officers just as any other enlisted men may by study and necessary service. Upon examination they are commissioned if found qualified.

The present policy of the Navy Department confines flight training to civilians who are members of the Naval Reserve. Young men between the ages of 18 and 28 who are college graduates may make application for this training. Men attending college or those possessing the equivalent of a college education are also eligible. They are required to pass the same rigid physical examination that is given to candidates for Naval Aviator.

These members of the Naval Reserve enroll as Seamen, second class, and are given a six weeks active duty course, on both theoretical and practical flying.

A candidate for Reserve Flight Training should make his application to the Commanding Officer, U. S. Naval Reserve Aviation Unit, at the unit located closest to his home. These Naval Reserve Aviation Units are located at:

Squantum, Mass.
Rockaway Beach, L. I., N. Y.
Great Lakes, Ill.
Sand Point, Seattle, Wash.

From the list of candidates making application for this training the commanding officer of the Naval Reserve Aviation Unit selects those who are to take the course. He is limited in his selection because the quota is determined by the appropriations made by Congress for the training. In order to obtain the best possible candidates, the commanding officer conducts a preliminary aviation ground school course in which theoretical aviation subjects are taught. The men showing the highest qualifications are selected for enrollment.

New type Loening Amphibian for Navy use, P-W Wasp Engine.

The primary training given the successful applicants in the Naval Reserve Aviation Unit consists of ten hours of dual instruction in a training type of seaplane. This is followed by 30 hours of solo flight. When the classes are large, and the planes available few in number, some of the students are unable to complete the full 30 hours of solo work within the six weeks allotted for the training. In such cases the student must complete his required hours within the next month, so that it is a decided advantage to him to live in the immediate vicinity of the reserve unit.

While undergoing training the student is rated as a seaman, second class, and receives in pay and allowances an average of $84 a month. In addition to this sum the Government provides transportation to and from his home.

During the summer following the completion of the primary course the successful students are sent to the Naval Air Station, Hampton Roads, Va., for advanced training. This is also a six weeks' course and includes additional theoretical instruction and about 50 hours of flying in regular service types of aircraft.

On completing this course the student undergoes a final professional examination and if he passes this successfully he receives a commission as Ensign, U. S. Naval Reserve, and a designation as Naval Aviator.

A man so commissioned is permitted to perform 15 days active flying duty with pay at a Naval Air Station or at the Naval Reserve Aviation Unit. He is also permitted to attend weekly drills at the Unit Headquarters to which he is assigned. In consideration for the performance of this flying duty, and for attending the drills, the Ensign receives approximately $375 per year. This amount increases with in-

(*Continued on page 64*)

Curtiss Shipboard Fighter with P-W Wasp engine.

South Atlantic Spanned

ON October 10 Dieudonne Costes, pilot, and Naval Lieutenant Joseph Le Brix, navigator and wireless operator, took off from Le Bourget Field, near Paris, with Buenos Aires, Argentina, as their goal. Their machine was a Breguet military biplane, christened "Nungesser-Coli," and the announced purpose of their 6,000 mile trip was to demonstrate the practicability of air communication and mail service between the Continent and South America.

Just twelve hours after leaving Le-Bourget the men were sighted over the airdrome at Casablanca, French Morroco, 1,200 miles from the start. The following morning they landed at St. Louis, on the Senegal coast of Africa. This was the longest leg of the flight, being 2,700 miles, and its successful completion with no sign of trouble developing gave the men additional confidence for the trip over the South Atlantic.

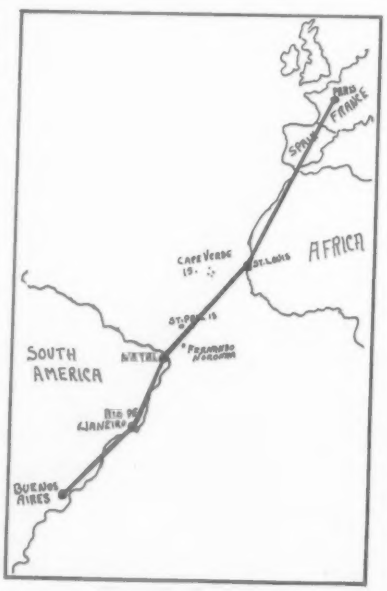
Torrential rains held the two Frenchmen at St. Louis until the 13th, as the flying field was too soggy for the take off with the full load of fuel and oil required for the trip.

The original plan of flying directly from St. Louis in Senegal, Africa, to Port Natal, on the eastward tip of South America, was adhered to. Other aviators have flown the South Atlantic, but hitherto have broken their journey at either the island of Fernando de Noronha, the Cape Verdes or St. Paul's Rocks. Commander Francesco de Pinedo of Italy, Ramon Franco of Spain, Gago Coutinho and Arturo de Cabral-Sacadura of Portugal, and Major Sarmiento Beires, of Portugal, have all made the South Atlantic flight, but each one of them landed at some island, thus cutting the distance to be traversed by several hundred miles.

Le Brix and Costes (left) befor the start of their flight. Costes held the world's distance flight record for a time.

Leaving Africa the course was laid directly for Port Natal and 21 hours and 15 minutes after leaving the flyers landed at their destination. Ships had reported hearing the plane while the airmen were still some distance off the coast. The navigation was accurate and the Lieutenant did not have to hunt for Natal.

Natal has no regular flying field, but a landing space had been prepared for them twelve miles from the city where they were greeted by a great crowd and formally welcomed by the governor of the state and high military and civil officials.



A quantity of mail sent by the Paris post office was delivered, in the record time of ten days, to the postal authorities at Buenos Aires, in the Argentine. The flyers made the trip from Port Natal stopping at several points en route, Caravallas, Pelotas, and Rio de Janeiro.

Both Spanish and French firms, as well as many South American Business men are interested in quicker and more direct communication between Europe and South America, and this latest feat was undertaken with more purpose back of it than a "stunt." There is a serious effort being made in South America to foster aviation in more than the military branches and many Europeans see opportunities for profitable business in the operation of transport lines across and to this great continent.

Air Races Pay

The National Air races and air derbies held at the Spokane airport, September 21-24th under the direction of National Air Derby Association of Spokane, fully paid their cost. Figures of the certified public accountants showed receipts of $114,063, and disbursements of $113,106, leaving cash on hand of $965. Close adherence was made to budgeted expenditures.

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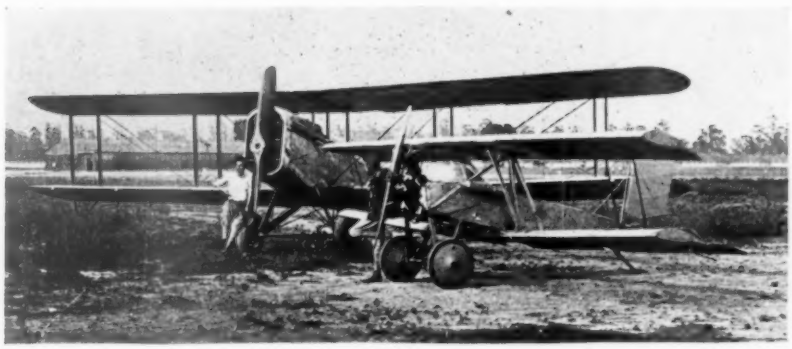
The Safe-Aircraft Competition

Sponsored by the Daniel Guggenheim Fund for the Promotion of Aeronautics



What type of aircraft will win this competition? Will it be a huge plane, a small one, or a freak?

For the first time in the history of aviation concerted efforts are now being made by manufacturers and designers to secure the essential elements of safety upon which the future success in aerial transport depends. The solution of this problem, which is the goal of the Daniel Guggenheim Safe-Aircraft Competition, is a matter of international importance. The participation of foreign experts is significant of an international effort to overcome the supreme obstacle in the path of aerial progress.

FIVE British and two American aircraft manufacturers and designers have filed applications to enter the Daniel Guggenheim Safe-Aircraft Competition, and one other American manufacturer has notified the Fund that it will enter a plane. Several of the manufacturers have their engineering departments making studies to ascertain what sort of a plane they may submit at a later date.

The British companies which will enter the competition are the DeHaviland Aircraft Company, Handley Page, Ltd., Glostershire Aircraft Company, Lt., Vickers, Ltd., and the company developing the Autogiro of Snor de la Cierva. The American entries are Schroeder-Wentworth Associates of Chicago, and the Hall-Aluminum Aircraft Corporation of Buffalo, N. Y. Anthony H. G. Fokker has signified his intention of filing an application later. Other entries are expected as the competition does not close until October 31, 1929.

Tests will be carried on from time to time until the closing date of the competition at Mitchel Field, Long Island, N. Y. The Fund has secured the co-operation of Major Howard Davidson, of the United States Army Air Service and Lieutenant Colonel Benjamin D. Foulois, commanding officer of Mitchel Field.

The winner of the Competition will receive a prize of $100,000, and the first five manufacturers to qualify and successfully pass the tests will each receive a safety prize of $10,000.

The qualifying requirements, briefly stated are as follows:

Power Plant: The engine must be of a type that has been submitted to tests, and cannot be hand cranked by directly pulling on the propellers.

Structural Strength: This must be in accordance with the requirements of the U. S. Department of Commerce Regulations.

Performance: The aircraft must have a maximum speed of 110 miles per hour; have a rate of climb (at 1000 feet) of 400 feet per minute.

Useful Load: The airplane must carry 5 pounds of useful load (pilot, observer, fuel and oil included) per horsepower.

Fuel and Oil: The airplane must carry sufficient fuel and oil for 3 hours at full throttle.

Instruments: The airplane must be provided with all necessary power plant instruments and also an altimeter and air speed indicator.

Accommodation: For every ten pounds of useful load carried in addition to the items specified above the airplane shall provide at least one cubic foot of cabin or cargo space. Adequate accommodation and dual control for pilot and observer are a requirement.

Vision: Adequate vision for pilot must be provided.

Fire Risks: All reasonable precautions must be provided.

The tests and demonstrations to which each type of aircraft are to be submitted are, briefly, as follows:

Speed Tests: With the object of demonstrating the ability to fly and glide at lower speeds than today possible, and to reduce the risk involved

Senor de la Cierva's Autogiro takes the air again. His company has entered the Guggenheim competition.

in forced landings, and when landing in confined spaces, each aircraft will be required to maintain level and controlled flight at a speed not in excess of 35 miles per hour. It must be able to glide for a period of 3 minutes with the power off, without having an air speed exceeding 38 miles per hour. All controls must be operative at the minimum speeds.

Landing Tests: To demonstrate the ability of the aircraft to land in a small field it must land, with power off, and come to rest within a distance of 100 feet from where it first touched the ground. Landing must be made in a straight line and braking devices are permitted.

The aircraft must be able to make a steady glide in over an obstruction 35 feet high and land in a straight line with power off and come to rest within a distance of 300 feet from the base of the obstruction.

Take-Off Tests: With the object of demonstrating that the airplane can take off from a small field and can climb at a steep angle to clear obstructions, the aircraft must be able to take off after running not more than 300 feet from a standing start. After taking off the aircraft must be able to clear an obstruction 35 feet high at a distance of 500 feet from the starting line.

Gliding Angle Test: With the object of proving the ability of the plane to glide for a reasonable distance in case of engine failure and also the ability to glide at a steep angle for approach to a landing the aircraft must be able to glide with all power off so that the angle between the flight path and the horizontal is not over 8 degrees; and the aircraft must be able to glide with power off so that the angle is not less than 16 degrees. During this test the air speed shall not exceed 45 miles per hour, and during both tests all controls must be effective.

Stability Tests: With the object of demonstrating the stability of the aircraft under normal conditions and to show that it will return to normal flight attitude when the controls are left free the aircraft must be able to fly at any air speed from 45 to 100 miles per hour and at any throttle opening with all controls left free for a period of not less than 5 minutes in gusty air. The aircraft is to be provided with means by which it can be trimmed so as to fly with the elevator control free at any speed between 45 to 100 miles per hour and at any throttle opening. The test for longitudinal stability will be to move the elevator control toward its maximum extent either forward or backward sufficient to give a fair test of the stability and then released. In either case the plane must return to steady flight in its original attitude within a reasonable time. During these stability tests the aircraft must hold a reasonably steady course and if disturbed from its original attitude must return to it without losing appreciable height.

Abnormal Conditions Test: To demonstrate the ability of the aircraft to recover from any attitude into which it may get from disturbances in the air, incorrect application of controls, or sudden failure under difficult circumstances, the aircraft must demonstrate that it can be satisfactorily controlled by the pilot in case of sudden engine failure in any attitude. The aircraft must demonstrate its ability to take up a steady gliding attitude when controls are left free from the moment of switching off all power.

The aircraft will be required to show that if the elevator control is pulled in toward its maximum extent at the moment of switching off the power, and held there, the aircraft will not get into any dangerous maneuvers, and that it will descend on a steep glide path at a speed not to exceed 40 miles per hour.

The aircraft is to be dived with all power switched off until the air speed reaches 20 per cent above maximum level flying speed. At this speed it must answer all controls and with controls released it must of its own accord return to a steady gliding attitude without serious loss of height.

The aircraft is to be flown at full throttle at an air speed of 45 miles per hour, trimmed for any speed from 45 to 75 miles per hour. The engine is to be switched off and at the moment of switching off the pilot is to move any one, or two or all of the controls so that an abnormal attitude results. Complete recovery is to be made with the aid of the controls and a steady glide taken up with a loss of height of not more than 250 feet. The same test is

(*Continued on page 64*)

Marcouiller and Rappold with the Rappold entry in flight.

The Memphis Model Tournament

TWO Chicago youths walked away with the Popular Aviation Trophies at the Memphis Model Aircraft Tournament, October 8. C. Krecjci of Chicago, in the Senior class, won 25 points in his division, while E. Marcouiller, also of Chicago, won 18 points in the Junior class. The third trophy, a silver loving cup, also offered by Popular Aviation, went to Evanston, Illinois, for having the greatest number of planes entered in the elimination contests in proportion to the population.

The duration record was set by another Chicagoan, Jack Lefker, 12 years old, whose model made a sustained flight of 5 minutes and 37 seconds. Jack Loughner of Detroit, a Senior, made a sustained flight of 2 minutes 13 seconds with his model.

Fifty-three contestants had been notified of their eligibility, but owing to the distance of Memphis from many of the cities represented, only about half of them appeared at the tournament.

The weather for the outdoor events was not propitious, and there were a number of crack-ups. Models that might have broken records came close to breaking some hearts. Events went off with regularity, and the contestants entered into the tournament in a serious fashion and with business-like attention to details.

The chief judge was Paul E. Garber, of the Smithsonian Institution, Washington; Merrill Hamburg, of Detroit, being the assistant. Judges were C. R. Borkland of Popular Aviation, with B. C. Friedman and N. L. Mallison, with W. C. Bathchelor, H. C. Callowhill and W. R. Reeves acting as assistants. Timers were W. C. Bechtold, T. Deering and G. S. Neal. The recorders were John Martin, G. A. Nesbitt and Arthur Williams.

The contestants and officials were guests of Lloyd T. Binford, president of the Columbian Mutual Life of Memphis, at a banquet held at the Gayoso Hotel, Friday, October 7. This was an unprogrammed bit of southern hospitality that added to the enjoyment of the boys. At the banquet Mr. Garber gave an illustrated lecture on the history of model aeronautics, showing the growth of the crude models of 20 years ago to the finished duration models of today.

The Hon. Edward P. Warner, Assistant Secretary of the Navy, talked on "Aviation and Youth," stating that "the elements of craftsmanship and sporting competition are ideally blended in the preparation and holding of such model contests."

The outdoor contests were held at

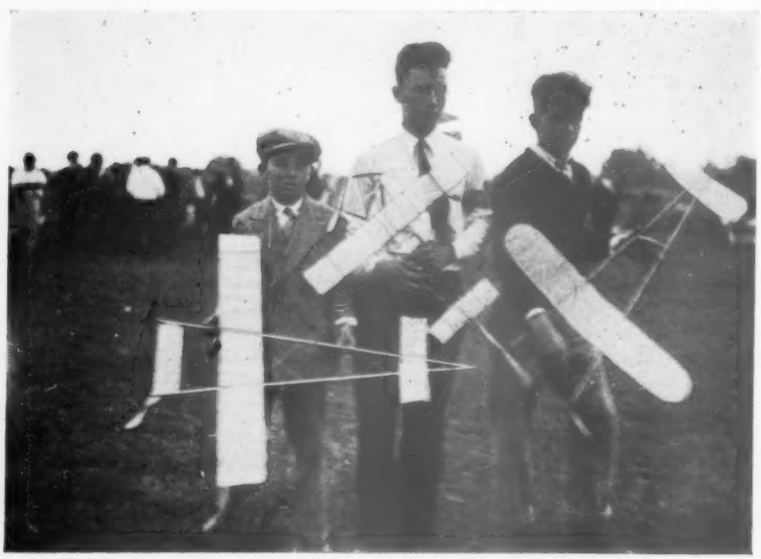
Jones Driving Field, Saturday morning, and lasted well into the late afternoon. The indoor contests were held in the Municipal Auditorium. The following contestants were eligible for the tournament on the basis of the records submitted to the National Association. Each of these contestants was the winner of a local tournament:

James Adair, Birmingham, Ala.
Lawrence Adams, Lynchburg, Va.
Lawrence Arnold, Saginaw, Mich.
William Atwood, Los Angeles, Cal.
Wendell Bailey, Oklahoma City,
Ralph Ballaugh, Lynchburg, Va.
Paul Barret, Los Angeles, Cal.
Edward Belman, Baltimore, Md.
Sidney Bressler, Brooklyn, N. Y.
Allen Brown, Richmond, Va.
Homer Buck, Los Angeles, Cal.
Walter Derieux, Knoxville, Tenn.
Lambreth Evans, Birmingham, Ala.
Parke Flournoy, Baltimore, Md.
Walter Fowler, Evanston, Ill.
Logaughn Giddings, Fort Worth,
George Goldie, San Diego, Cal.
John Graham, Jacksonville, Fla.
Edward Harms, Evanston, Ill.
Ernst Hausselin, San Francisco, Cal.
William Irons, Jacksonville, Fla.
John Jendrick, Baltimore, Md.
William Kelly, Baltimore, Md.
Ollie Koppa, Fort Worth, Texas.
Nick Kozlow, Los Angeles, Cal.
C. Krecjci, Chicago, Ill.
Jack Loughner, Detroit, Mich.
J. T. Landsberg, Jacksonville, Fla.
J. Lefker, Chicago, Ill.
Robert Leonard, San Diego, Cal.
E. Marcouiller, Chicago, Ill.
Theodore Marz, Salt Lake City,
Paul Meyer, Cleveland, Ohio.
Tudor Morris, Peru, Ind.

Winding the motor on Lefker's model.

Edwin O'Donovan, Topeka, Kan.
Frank O'Keefe, Jacksonville, Fla.
W. Pierce, Brooklyn, N. Y.
J. Rappold, Chicago, Ill.
Virgil Rassner, Peru, Ind.
Harold Reed, Topeka, Kan.
Ray Reismyer, Pittsburgh, Pa.
Charles Reith, Pittsburgh, Pa.
Marion Robinson, Baltimore, Md.
J. Rosich, Chicago, Ill.
B. Schwartz, Chicago, Ill.

J. Lefker. Harold Reed and Virgil Rassner, placing in the Outdoor Junior Duration.



Burton Simcox, Knoxville, Tenn.
Cyril Smith, San Diego, Cal.
Spencer Tinder, Richmond, Va.
Arthur Wade, Saginaw, Mich.
Tom Webb, Lynchburg, Va.
Meade Wood, Richmond, Va.
Edward Schuette, Cincinnati, Ohio.

Outdoor Events

Event No. 1: Rubber motor, hand launched, Juniors; first place, J. Lefker, Chicago, 5 minutes 37 seconds; second Harold Reed, Topeka, Kan., 1 minute 58 seconds; third, Virgil Rassner, Peru, Ind., 1 minute 57.4 seconds.

Even No. 2: Same as No. 1, Seniors; first place, Jack Loughner, Detroit, 2 minutes 13.2 seconds; second, J. Rappold, Chicago, 1 minute 27.8 seconds; third, Wendell Bailey, Oklahoma City, 1 minute 19 seconds.

Event No. 3: Any self-contained motive power other than rubber, Juniors; no contestants.

Event No. 4: Same as above, Seniors; first, William Atwood, Los Angeles, 5.2 seconds; only contestant. (Clockwork motive power.)

Event No. 5: Optional power, rising off water, Juniors; first, Virgil Rassner, Peru, Ind., 1 minute 5 seconds; only qualifier,

Event No. 6: Same as above, Seniors; first, Marion Robertson, Baltimore, .5 second; only qualifier.

Event No. 7: Commercial models, rubber motor, hand launched, Juniors; first, Tudor Morris, Peru, Ind., 20.6 seconds; second, B. Schwartz, Chicago, 6.6 seconds; third, Burton Simcox, Knoxville, Tenn., 6.2 seconds.

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Event No. 8: Same as above, Seniors; first, C. Krecjci, Chicago, 24.6 seconds; second, William Atwood, Los Angeles, 16.4 seconds; third, Jack Loughner, Detroit, 5 seconds.

Event No. 9: Weight carrying, Juniors; none qualified.

Event No. 10: Same as above, Seniors; first, C. Krecjci, Chicago, .099 ratio; no other qualifiers.

Indoor Events

Event No. 1: Gliders, any type of launching not over 6 feet from floor, Juniors; first, Burton Simcox, Knoxville, Tenn., 8 seconds; second, J. Lefker, Chicago, 7 seconds; third, E. Marcouiller, Chicago, 6.6 seconds.

Event No. 2: Same as above, Seniors; first, C. Krecjci, Chicago, 10.2 seconds; second, J. Rappold, Chicago, 8.8 seconds; third, Walter Derieux, Knoxville, Tenn., 7.8 seconds.

Event No. 3: Withdrawn.

Event No. 4: Withdrawn.

Event No. 5: Motor propelled airplanes, not to exceed 40 inches over all, Juniors; first, Virgil Rassner, Peru, Ind., 1 minute 47 seconds; second, E. Marcouiller, Chicago, 1 minute 38.8 seconds; third, Ernst Hausselin, San Francisco, 40.4 seconds.

Event No. 6: Same as above, Seniors; first, J. Rappold, Chicago, 2 minutes 9.6 seconds; second, Jack Loughner, Detroit, 2 minutes 9.6 seconds; third, C. Krecjci, Chicago, 1 minute 30.8 seconds.

Ernest Marcouiller, of Chicago, with his Popular Aviation Trophy, medals and his scale model.

Marion Robertson of Baltimore.

Event No. 7: Commercial models, rubber motor, Juniors; first, E. Marcouiller, Chicago, 18.4 seconds; second, Tudor Morris, Peru, Ind., 18 seconds; third, Burton Simcox, Knoxville, Tenn., 2 seconds.

Event No. 8: Same as above, Seniors; first, J. Rappold, Chicago, 22 seconds; second, William Atwood, Los Angeles, 20 seconds; third, C. Krecjci, Chicago, 13.6 seconds.

Event No. 9: Weight carrying, Juniors; first, Tudor Morris, Peru, Ind., .191 ratio; second, E. Marcouiller, Chicago, .081 ratio; no other contestants.

Event No. 10: Same as above, Seniors; first, C. Krecjci, Chicago, .452 ratio; second, J. Rappold, Chicago, .207 ratio; no other contestants.

Gold, silver and bronze medals were awarded by Popular Aviation to the winners of first, second and third places in each event, and each participating contestant received a bronze medal as a souvenir of the meet.

The workmanship on the small models was surprisingly fine, delicate materials having been handled with a skill that would surprise the average layman.

The interest evoked by this Tournament has been such that it will undoubtedly be made a regular annual affair. Popular Aviation wishes to pledge its fullest support and co-operation in any effort along this line.

Utah Flying Club

Utah Flying Club—V. G. Halliday, President; W. H. Sprunt, J. J. O'Brien, H. H. Halliday, F. Whittler, L. P. Geoghegan.

THE new flying Club of Utah, organized three months ago after the idea grew for over a year in the mind of Mr. V. G. Halliday, president of the club, offers something new and useful to flyers in the state. This club has a state-wide scope and will induce the people in various cities to secure local flying fields and thereby promote aviation in all parts of the state.

Membership in the club is open to any congenial man interested in flying. An initial fee of $100 was charged each of the 15 charter members to partly cover the cost of the Lincoln Standard Tourabout plane chosen by the club for its use. Then $10 a month is to be paid by each member until all of the first costs are taken care of. This latter fee entitles each member to 10 hours of flying instructions under competent pilots taken from the regular commercial air service. Financial backing was also secured from prominent business men in the city of Salt Lake and the present plane is christened "Amy Redman" as a symbol of appreciation for Mr. Ben F. Redman's generous contributions. Mr. Redman is chairman of the Aviation Committee of the Chamber of Commerce.

Three licensed pilots are now employed in instructing the club members and Lt. Russell L. Maughn, America's first "Dawn to Dusk" flyer, is also an adviser. After the members are capable of handling the plane alone, they are able to lease it at any time for a nominal sum per hour.

Although only one plane is in use so far, an order is being placed for a second plane since two cities besides Salt Lake are considering the advisability of flying fields at the present time. It is hoped to eventually scatter units of the club throughout the state and station one plane at each city for the use of the members at the various places. This will give pilots practical experience and a chance to continue their knowledge of flying gained during the war. Officers for the National Reserve Flying Corp will likewise be created, since after taking the required tests and examinations the men will be qualified for that service.

The "Amy Redman," Lincoln Standard used by Utah Club.

It is expected the club will increase to over 200 members during the coming year and so far all members are unusually enthused with the project.

The purpose of this corporation, whose present officers are V. G. Halliday, president and director; Lawrence W. Despain, vice-president and director; Brigham Y. Hardy, secretary-treasurer and director; Ray T. Elsmore, director, and F. W. Browning, director, can better be explained by a quotation from the Articles of Incorporation:

"To establish, promote and develop interest in aviation by practical demonstration, the dissemination of facts and information; to promulgate the knowledge of aeronautics by securing speakers, instructors and literature for the teaching of aerodynamics; to aid in the advancement of aviation by lending support to all branches of aeronautical activity, together with new developments in aeronautics; to give the members practical experience in the maintenance and flying of aeroplanes, by operating, building, designing, owning and maintaining aeroplanes. To have the right to own and maintain a club house or houses for club purposes, aerodromes and hangars, and for such purpose to acquire

(Continued on page 62)

Fairchild Cabin Plane of U. S. Department of Commerce used on tour.

The Lindbergh Tour

AS a practical demonstration of the reliability of air transportation the Lindbergh Tour stands out as a real accomplishment. Every state in the Union was covered and 82 stops were made by Lindbergh, in the Spirit of St. Louis, and the Department of Commerce plane which accompanied him. Once only was there a delay, when a dense fog prevented the arrival at Portland, Maine.

Any other form of transportation could hardly have bettered this record, considering the number of miles flown in all sorts of weather; and the fact that for three months every engagement, with the one exception, was filled on time is in itself as much of an advertisement of aviation as the promotion work done on the tour by means of speeches.

Lindbergh, with his co-pilot, Lieutenant Love, have shown every state that airplanes can be operated on schedule if kept in good condition and carefully piloted. There were no accidents of any sort whatever and under the prevailing weather conditions, whatever they were at the time, the two planes of the Tour arrived in each city promptly at two o'clock in the afternoon.

Mr. MacCracken, Assistant Secretary of Commerce for Aeronautics, has stated that the Tour has had three major results. First—the stimulation of interest in and the increase in the use of the air mail. Second—it has inspired municipalities to acquire or improve their airports. Third—it has demonstrated the reliability of present day aeronautical equipment.

"There have been, to my mind, surprisingly few aviation accidents in the United States during the past year in view of all the circumstances. Hardly any of the accidents can be attributed to commercial development."—Harry F. Guggenheim.

The following statistics of the tour are interesting in view of the nation-wide enthusiasm produced:

Hours of flying time.....	260
Number of miles flown....	22,350
Number of touch stops made	13
Number of long stops made	69
Total number of stops.....	82
Number of times late.....	1
Number of times on time..	81
Number of messages dropped	192
Number of speches made..	147
Number of dinners attended	69
Number of miles paraded..	1,285
Number of people attending parades, etc. 30,000,000	
Number of states visited...	48
Number of state capitols visited	23

Col. Lindbergh was accompanied on his tour by a Department of Commerce plane, carrying representatives of the Department and the Daniel Guggenheim Fund, which arranged for tour. This plane was flown 20,350 miles. Both planes functioned perfectly throughout the tour. There were no forced landings, no everhauls and no delays due to mechanical difficulties.

The tour did not follow regular lighted airways and the planes were flown in all kinds of weather and in both daylight and complete darkness. At least 25 per cent of the mileage covered was over mountainous territory.

As the tour was originally laid out, Thursdays and Saturdays were to be "rest" days, but Lindbergh elected to fly on some of these rest days, which in itself is proof that reports about his "exhaustion" had no foundation in fact.

It is interesting to note that both the

Whirlwind engines in the two planes were not overhauled, the one in the Department of Commerce plane, a Fairchild four-passenger cabin plane, and the one in the Spirit of St. Louis, Lindbergh's Ryan monoplane, performing perfectly for the entire trip. Lindbergh's engine has been in the air over 350 hours, a total of over 33,000 miles, without an overhaul. This is a demonstration of the reliability of the engine that needs no comment. Automobile motors are ready for an overhaul by the time that much mileage has been recorded. Incidentally, the air-cooled engine has removed the cause of nearly 30 per cent of forced landings, that many being due to failure of some part of the cooling system.

It is impossible to estimate the number of people who heard Lindbergh's speeches, for, in addition to the several million that actually saw and heard him in person, an untold number listened to his speeches over the radio. Unquestionably the tour has been one of the greatest pieces of publicity for the promotion of air travel and the selling of air transportation to the public.

Wright Air Field Dedicated

On October 12th Wright Field, Dayton, Ohio, was dedicated to the use of the Government. It occupies almost the identical spot where the Wright Brothers made some of their first flights after their return from Kittyhawk, N. C., where the first flight was made. The old shack in which many of their early models were constructed still stands over the hill from the great new hangars and shops.

In 1917 Col. E. A. Deeds, then head of a Dayton manufacturing company, organized an engineering division to make the necessary researches into aviation matters that were called for by the entrance of the United States into the World War. Laboratories were established at Dayton and McCook Field was laid out.

After the war McCook Field continued to be the engineering center of the United States Army Air Corps. As research work increased McCook Field became too small for the work being done and as the lease was about to expire it began to look as if the government would abandon Dayton as the center of the Army air work.

The late John H. Patterson, head of the National Cash Register Company, was the leader of a movement that resulted in the purchasing of a site comprising 4,500 acres of land by means of public subscription. This land, which represents the offering of the people of Dayton and the Miami River valley, was donated to the government for a new field.

So far the land, equipment, buildings and other improvements represents an investment of approximately $5,000,000, and when completed will be nearly double that sum.

The ceremonies of dedication were participated in by Secretary of War Dwight F. Davis, Major-General Mason M. Patrick, and many others.

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Famous Flights

The NC-4 Trip

IN 1913, prior to the War, the London Daily Mail offered a prize of $50,000 for the crew of the first airplane to fly the Atlantic. The conditions were simple enough; the flight was to be made from any point in the British Isles to any point in Newfoundland, Canada, or the United States, or in the reverse direction; the flight had to be completed in 72 hours; and the flight had to be made direct, and not by way of the Azores. Repairs were to be permitted during the flight, but machines could not be changed.

During the War no attempts were made to lift this prize, although unquestionably it was the goal of many an aviator in both the United States and England. The progress made in aviation during the War, and the fact that many intrepid flyers were seeking an outlet for their energies, made it practically certain that the Daily Mail would have to award the prize shortly after the close of hostilities.

The first entrant to present himself was an Australian, Harry Hawker, who had been associated during the war with the Sopwith Aviation Company. This firm offered to build Hawker a plane for the attempt. Accordingly a specially designed plane with a detachable undercarriage was constructed. The design called for a boat shaped body which could, under necessity, alight on the water. The undercarriage was to be dropped after the take-off so that if a descent in Mid-Atlantic was forced the plane would not be damaged by the tearing away of the gear.

Hawker chose Lt.-Commander Mackenzie-Grieve of the Royal Navy for his navigator, and when the plane was completed the two of them made a non-stop flight of over 1,800 miles over the Brooklands Airdrome in order to test the staying qualities of the 350 horsepower Rolls-Royce engine which had been installed. The machine behaved perfectly, although at the take-off the total weight of ship, fuel and crew was nearly 5,500 pounds.

It had been decided by the two men that they would make the attempt from west to east, so accordingly they took ship for St. John's, Newfoundland, where they arrived in March, 1919. Their calculation of the flight estimated the duration to be somewhere in the neighborhood of twenty hours, and they wished to start about the middle of April in order to have the benefit of the full moon. The starting time was to be late in the afternoon or the early evening in order that landing might be made in England during daylight of the next day.

While preparations went forward for the flight, and the two men awaited word of favorable weather conditions, another plane was shipped to St. John's, and the waiting developed into a rivalry as to which crew would be the first to take off. April passed with storm after storm preventing a take-off, and the middle of May, with another full moon came. On May 18th Hawker decided to leave, although weather conditions were not exactly what he desired. He was spurred to this decision by hearing that Lt.-Commander Read had left the United

Harry G. Hawker, who made the first attempt to cross the Atlantic in an airplane.

States for Europe, via the Azores, and had actually reached the islands. Although Read was ineligible for the prize of the Daily Mail, Hawker wished the honor for the first flight across the Atlantic.

The last-minute preparations were completed, emergency rations stored in the body of the boat, and signalling apparatus stowed away. A small radio sending set formed a part of the equipment. The take off was a success but the great weight of the fuel load of 350 gallons nearly caused disaster at the very start, as the plane barely cleared the farm fences at the end of the runway.

Hawker ran immediately into the fog which is so common off the Newfoundland coast, but managed to gain enough altitude so that he flew above it for nearly four hours. With nightfall the weather conditions became worse, a heavy rainstorm coming up and with it a north wind, which made navigation difficult. To add to the trouble the gauges showed the temperature of the water in the radiator to be climbing steadily. Repeated diving toward the sea and slow climbs kept the radiator temperature down for some time, but in climbing to avoid a great storm Hawker was compelled to reach an altitude of 15,000 feet, which made the water in the radiator boil to such an extent that clouds of steam were thrown out, immediately forming ice on the plane. An immediate dive to within a few feet of the water again saved the situation.

When dawn came the men estimated that practically half the distance had been covered, as they figured that an average speed of 85 miles per hour had been maintained, making their distance 950 miles. The radiator trouble had reached a point where it was obvious that a descent would be forced before many hours. For two hours Hawker zigzagged above the traffic lane of the North Atlantic, hoping to sight a vessel. Their chances of being picked up were slight indeed if they were not first observed in the air. The water was so rough and storm tossed that the plane would probably not live in the water for long. Finally they succeeded in locating a small steamer, the Mary, of Copenhagen, and after making certain that they had been sighted by the lookout made a water landing a mile ahead of the Mary.

The landing damaged the plane to a great extent, but it did not sink, and in time the Mary managed to launch a boat and pick up both Hawker and Mackenzie-Grieve. The Sopwith had to be abandoned.

Meanwhile a waiting world had received no word from the plane, and no reports came through of its being sighted. For six days friends of the flyers on both sides of the Atlantic kept up their hopes, but finally gave up the two men as lost.

On May 25th the Mary, which had no radio apparatus, signalled the coast guard station at the Butt of Lewis, the northern point of the Hebrides, that they had recovered "All Hands Sopwith Aeroplane." Naturally the word spread like fire and a destroyer was sent from Scapa Flow to take off the two men. Their procession through England was one ovation after another,

Sir Arthur Whitten Brown, of the British Royal Flying Corps, who made the first non-stop flight across the Atlantic with Capt. John Alcock.

and at the conclusion in London, they were presented with the Royal Air Force Cross and a consolation prize from the Daily Mail of $25,000.

A few days later the Sopwith was picked up in Mid-Atlantic by a steamer and brought to England, almost a total wreck.

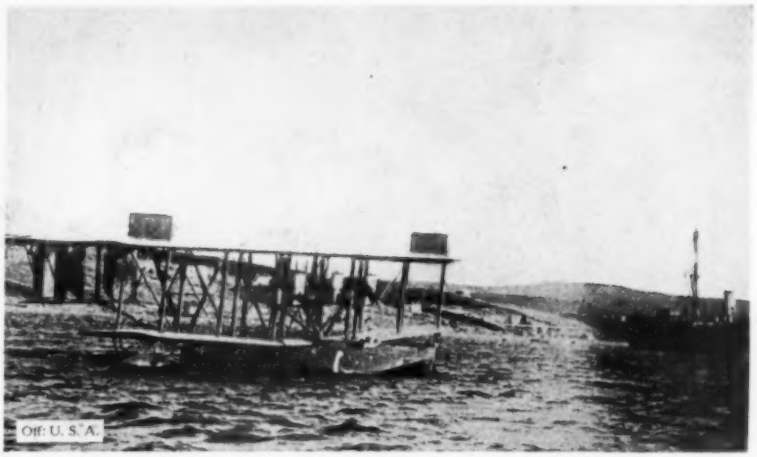
Meanwhile the United States Navy's attempt for crossing the Atlantic had gone steadily forward. Characteristically the Navy made thorough preparations so that nothing was to be left to chance and all the facilities of its great organization were brought into use to insure success. The route selected was from Trepassey Bay, Newfoundland, to Lisbon, Portugal, with the Azores as a mid-stop. From Lisbon the flight was to be continued to Plymouth, England, where the Pilgrims had embarked for the trip to America 300 years before.

The total mileage of the route was 3,130 miles, which made a non-stop flight out of the question. The machines selected for the trip did not have a fuel capacity sufficient for any such distance, so a stop was planned at the Azores, about 1,400 miles from the starting point.

Navy-Curtiss machines were selected for the attempt, and four of them were chosen, although later the NC2 had to be taken out of the trip. These Curtiss planes were biplanes with a span of 126 feet, a length of 68 feet and a height of 24 feet. The boat body of the NC's measured 44 feet in length by 10 feet in width by 7½ feet in depth and was divided into six compartments.

The bow compartment contained the navigator's cockpit, with the dual control pilot cockpit immediately back of it. Fuel and oil occupied the next two sections, while the wireless operator had the stern compartment. The NC type weighed, loaded and with crew, 25,000 pounds. The motive power was furnished by four 400 horsepower Liberty engines. Two were mounted tandem over the hull, one tractor and one pusher, with an additional tractor mounted engine on either side.

The designers of the NC type had entirely eliminated the rear end of the boat hull. Ordinarily, in flying boats, the tail surfaces were attached to the hull directly, which would have made a hull far too heavy in the case of a seaplane as large as the NC type. The other alternative would have been to lighten the hull by weakening the structure. The tail surfaces were mounted on outriggers, which not only gave a comparatively short and compact hull, but provided exceptionally strong surfaces.

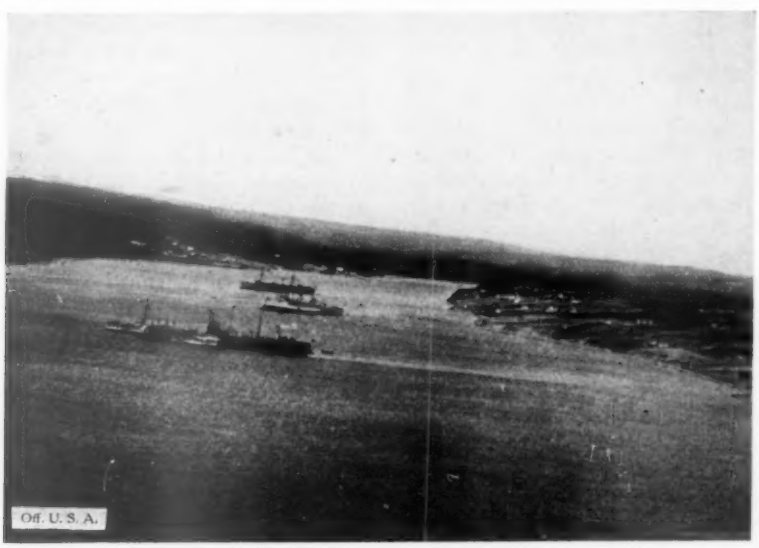


The NC-1, at Trepassey Bay, where the start for the Azores was made.

The NC type of planes not only used Liberty motors, but an all-aluminum gasoline system, box section beams and a box tail, innovations at that time.

The first of the NC planes, the NC-1, was building at the time of the armistice in 1918, and at the close of the war the navy department decided that it would make the attempt to fly the Atlantic. The naval organization planned for the best possible auxiliary service, which would include government weather reports, the use of radio equipment, a supply of destroyers for use as tenders, and the establishing of a line of destroyers from Trepassey, New Foundland, to Lisbon, Portugal.

The original NC-1 had three tractor motors only, while the NC-2 had been fitted, experimentally, with a pusher in the central nacelle and two tractors. The designers added a fourth motor to the NC-2 as an experiment, taking the motor out of the central nacelle, and mounting the two as pushers. It was found that this arrangement added only a little over 1,000 pounds in weight, but gave the NC-2 nearly 4,000 pounds more carrying capacity. The NC-1 and NC-3 were motored in a different arrangement, three tractors and one pusher, which also proved eminently satisfactory. This put a pusher and a



Part of the ocean patrol of United States Naval vessels which dotted the line of flight.

The crew of the NC-4 after arriving at the Azores. (Left to right) Stone, Rhodes, Hinton, Rhodd, Breese, Commander Read, with Admiral Jackson.

tractor in the central nacelle, and a tractor on each side.

The NC-1 was damaged in a storm during March and it was decided to fit her with the wings of the NC-2. At the same time the NC-4 was equipped with a motor arrangement identical with that of the NC-1 and NC-3.

Commander John H. Towers, of the United States navy, had been placed in charge of the expedition and the route was definitely chosen to go from Far Rockaway, L. I., to Trepassey, Newfoundland, thence to the Azores, either San Miguel or Fayal to Lisbon and then to Plymouth. The start was to be made as early in May as possible, in order that the advantage of the full moon might be had. Tests of all the planes and instruments were made at Far Rockaway during March and April, and the crews were finally selected.

The flagship was the NC-3 in command of Commander J. H. Towers, with Commander H. C. Richardson and Lieut. D. H. McCullough as pilots, Lieut.-Commander R. A. Lavender as radio operator, and Machinist L. R. Moore as engineer. Lieut.-Commander R. E. Byrd, as assistant navigator, and Lieut. B. Rhodes as reserve pilot engineer, went as far as Trepassey Bay with the NC-3.

The NC-4 was commanded by Lieut.-Commander A. C. Read, with Lieuts. E. F. Stone and Walter Hinton as pilots, Ensign H. C. Rodd as radio operator, Lieut. J. L. Breese as reserve pilot and engineer and Chief Machinist's Mate E. C. Rhodes as engineer.

The NC-1 was in charge of Lieut.-Commander P. N. L. Bellinger, with Lieut-Commander M. A. Mitscher and Lieut. L. T. Bairn as pilots, with Lieut. H. Sadenwater as radio operator, Chief Machinist's Mate C. I. Kesler as engineer and Machinist R. Christensen as reserve pilot engineer.

On May 3 the three boats were commissioned, and on May 8, 1919, the start for Trepassey Bay was made in good weather and with all conditions propitious. Trepassey Bay is about 1,150 miles from Far Rockaway, Long Island. The NC-1 and NC-3 arrived there the evening of May 9, but the NC-4 had been forced to descend near Cape Cod on account of engine trouble, and she did not rejoin her sister ships until six days later.

One new engine and three new propellers were installed in the NC-4 at Trepassey Bay and on May 16 all three were ready for the start to the Azores, nearly 1,200 nautical miles distant. A line of destroyers stretched ahead on the sea and at intervals sent up rockets by which the flyers could check their positions. All three ships managed the night flight with no difficulty, but toward dawn the NC-4 ran into rain and fog. Destroyer No. 16 was sighted, but No. 17 was missed in the fog. The cloud bank extended to 3,000 feet, but at that elevation flight was without difficulty. Communicating with the destroyers, adverse reports were received over the radio as to visibility, but when No. 21 was picked up the surface boat announced that visibility was improving. Descending, Flores was sighted, but the fog closed in again.

Destroyer No. 23 was missed and a hunt for land had just begun when a rift in the fog showed Fayal Island. This gave them their bearings and they made a sea landing near Horta.

The NC-3 and NC-1 had not been so fortunate. They had sighted none of the destroyers since No. 13, and had passed through more than five hours of rain-squalls and fog. Sea landings had to be made within 100 miles of the Azores. The crew of the NC-1 was taken off by the Ionia, and an attempt made to tow the plane, but the seas were too heavy and it sank off Corvo. The NC-3 was damaged in landing and could not take off again, and although radio messages could be received there was something wrong with her transmitting apparatus.

The navigator had fixed her position

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as 45 miles southwest of Horta, but the wind prevented taxying toward land. One wing tip was washed away and one of the crew crawled out on the other wing to keep it from being submerged. Two hours supply of gasoline was left and they were 45 miles from land. The radio informed them that a search was being made for them to the west instead of to the south of Flores. For twenty-five hours the NC-3 drifted until it reached a position where it was thought that Ponta Delgada could be reached. Then the engines were started and the crippled ship managed to make the harbor under its own power.

The NC-4 had to go on alone, as the NC-3 was too badly crippled for repairs. On May 20th it reached Ponta Delgada and on the 27th took off for Lisbon. The flight to Lisbon was comparatively simple, no difficulties being encountered. The course was held for the entire distance and the flight was made in less than ten hours, at an average speed of 93 miles per hour.

On May 30th the NC-4 left Lisbon, bound for Plymouth, England. A descent was made a few miles from Lisbon at Figueira, and one stop was made at Ferrol, which was reached the same day. The following morning the trip was resumed and Plymouth was raised about nine o'clock in the morning on May 31, 1919.

Columbus had taken 71 days for his voyage across the Atlantic. In less than 71 hours of flying time the Atlantic had been crossed with more than twice the same distance covered.

This trip was in no sense a stunt. It was undertaken by the navy for a set purpose and it was accomplished. Proof had been offered that flight itself was not the real difficulty. The trip had shown the necessity for the development of instruments which would enable aviators to fix their position, for ability to fly through fog, and ability to land and navigate upon the water if necessary. Lessons learned from this first crossing of the Atlantic by air were to be of the utmost value to designers and engineers in the future.

Although the Atlantic had been crossed for the first time by air in a heavier-than-air machine, the Daily Mail prize still remained to be won. The American success had not been inspired by the prize and the route, with a stop at the Azores, disqualified the crew. Contestants were not lacking, however, and even before Hawker made his attempt another entrant was on his way to Newfoundland in order to have a try at the honor of being the first to make a non-stop flight across the Atlantic.

A Vickers-Vimy army bomber had been stripped of its military fittings and remodeled for the purpose of the flight. The fuel tanks had been enlarged so that they had a capacity of 865 gallons, sufficient for nearly 2,500 miles of flight. The great machine was powered with two 350 horsepower Rolls-Royce engines, either of which would maintain flight when half the fuel had been used. Both motors were necessary to flight with a full load.

Captain John Alcock was selected as the pilot for the plane, and Lieut. A. W. Brown as navigator. The men arrived at St. John's, Newfoundland, on May 24, 1919, and set to work immediately to reassemble the plane. On June 9th a trial flight was made, and again on June 12th, with everything functioning perfectly. Captain Alcock did not propose to have anything clog his cooling system, so all the water used in the radiators was boiled, filtered and strained before being put in. The gasoline was strained several times also.

Preparations were made for a start early on June 14th, but conditions were so favorable on the evening of the 13th, with a favorable weather report at hand that a start was made late in the afternoon of the 13th. Possibly a rumor that a Handley-Page plane was about to start from Harbor Grace had something to do with the anxiety of the men to be off.

The take-off was perfect, although the Vickers-Vimy climbed slowly at the start. A tail wind added to the speed, but the visibility soon became very low. For practically the first seven hours of flight the flyers had no view of either sea or sky, as they ran

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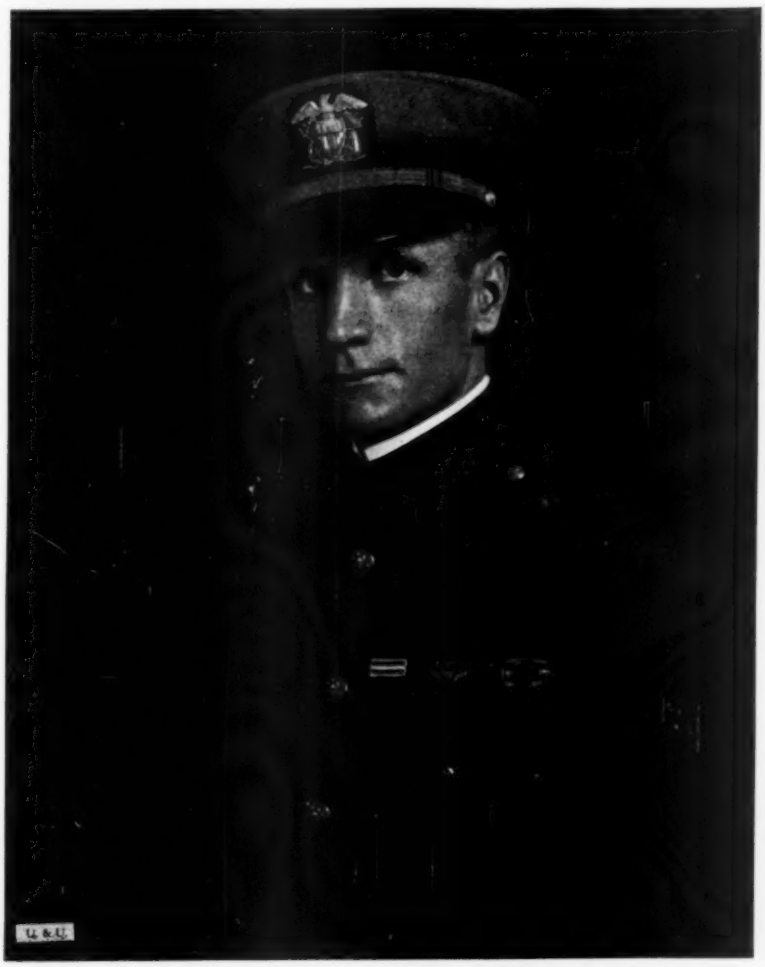


Lieut. Com. Albert C. Read, commander of the N. C. 4.

Current Comment

Air Travel Costs

Letters of opposite tenor seem to be the usual thing in any editorial office, but we have been struck particularly with the number of letters taking both sides of the question of the cost of air travel. An analysis of the letters, and particularly of their source, brings out the interesting fact that those who claim air journeys are too expensive are people who wish to travel for fun (and want the transport company to work for the same stipend). The letters taking the attitude that air travel is a cheap form of transportation seem to come, almost exclusively, from business men.

After all, the cost for a party of five to travel from Chicago to New York and return, in a chartered plane, compares favorably with train fare, if one wishes to consider Pullman, meals and tips. The fact that a day's business may be transacted in New York by a Chicago group, or vice versa, with the loss of but two days from work at the home office, is worth something. This contemplates day flying only. With night flying there need be no loss of business time whatever.

A Decoration Earned

The award of the Distinguished Flying Cross to Lieutenant Wyatt comes as a reward for his work in the Alaska mapping expeditoin, but there are many who feel that he earned it a second time without engaging in any flight. When Wyatt was placed in charge of the navigation examinations for the Dole Race entrants there were a few who wished to present him with an entirely different type of decoration. He earned some sort of recognition for the uncompromising stand he took against foolhardy risks, particularly in the face of adverse criticism.

The Flying Senator

Senator-Elect Robert F. Wagner, from New York, is setting an example for other officials, congressmen and members of the government to follow. There is no advertising that would be nearly so effective in advancing aviation commercially as to have the whole United States Senate fly to Washington—and Senator-Elect Wagner is going to do that little thing.

If half a dozen more representatives and senators will follow in his—footsteps isn't the word; ah!—slipstream, the public will be more likely to follow their example. In which case, commercial aviation in America may be said to have arrived.

By using an airplane to commute between New York and Washington over week-ends, the senator will save during the session about twenty-four days' time in traveling. If these days were laid end to end, we don't know what they'd make, but the senator is nevertheless to be complimented and congratulated upon his initiative.

Apparently he wants to make his middle initial stand for "flying!" Robert "Flying" Wagner!

A good name—and may his tribe increase!

Creating Good Will

Practically every commercial air field, particularly the mail fields, are distinguished by the crowds of "fans" who flock to it at regular hours to see the arrivals and departures. There is a fascination about this that cannot be understood by those who have not been on the ground when the planes come in. The night arrivals are particularly impressive. We have yet to visit such a field and not be impressed by two things, one of which is, of course, the spectacle.

The other is the courtesy and efficiency of the ground crew. They have their troubles keeping spectators off runways, but invariably it is done with good humor and without that self-importance that goes against the average American's grain. Whether the operating companies have realized it or not, their crews are making customers and friends that number into the thousands.

Cool Treatment

Probably every civilian flyer in the United States who has landed in any of the army fields has experienced a type of welcome that might be glossed over by calling it "cool." It is in great contrast to the treatment of American flyers landing in flying fields belonging to foreign governments, with perhaps one exception, and certainly different than the treatment accorded by other military establishments to their own nationals who fly.

Of course, we all realize that military fields exist for purposes far different from peace time pursuits, but still the fact remains that here is one arm of the government that might co-operate with the other branches of the public's servants to aid and encourage aviation.

Current Comment

A Question of State

The protest made in some quarters against the establishment of a foreign air service that will operate air transport over the Canal Zone brings to a head a state question that will have to be settled by a determination of policy. Certain foreign countries have rigorously enforced their regulations about flight over fortified and military reservations. It becomes a national question with us if we are to permit the establishment of an air line over the Panama Canal Zone. There is another side to the question—if we, as a country, are unwilling to establish this line ourselves, can we rightfully stand in the way of an important development by refusing our sanction.

Traffic Levels Needed

Any observer who spends time at a busy flying field cannot help but think that the time will have to come when the rapidly increasing traffic must be confined to certain levels. Possibly future governmental legislation will provide for the mail service a certain fixed level, for travel in one direction and another level for travel in the opposite direction. Taxi services may be compelled to travel at another level, with transports operating at still different levels. Of course, one objection presents itself at once, and that is weather conditions and the desirability of seeking higher or lower levels for safer conditions, but flight history shows a steady conquering of adverse weather and this may not be a consideration in a few years.

Sales Effort Needed

So far, the manufacturers of aircraft have faced conditions far from normal, considered strictly from the manufacturer's standpoint. From a point where individuals stayed in business only because of their convictions and their love of the business, not because of profits, the industry has progressed to a point where many of them find themselves loaded with more orders than can be taken care of with present facilities.

Such a condition will adjust itself—business has that habit. Meanwhile, those who start to view the manufacture of aircraft as a production question, and the disposal of them as a sales question, will have a head start on the others. Constructive sales effort is needed. The proof of it lies in the fact that live sales agents who have worked their territories have generally surprised themselves and their home offices with the volume of their sales. The market exists—and in surprising places. A planned and co-ordinated campaign, backed by careful quantity production, has possibilities beyond conditions of the moment.

The Aircraft Conference

The action of the Department of Commerce in calling together all those interested in Aircraft for a conference in Washington is perhaps one explanation of the fact that we have, strange to say, one governmental bureau of which there is little criticism. In these over-governed, over-legislated days, criticism of government control is one of the favorite indoor sports. The Depaartment of Commerce, through the Bureau of Aeronautics, has accomplished a difficult task with little criticism leveled at it, and less deserved. Regulations have had to be made, a licensing system developed and a foundation laid down for future regulations. All this with few mistakes and in the face of the age-old feeling that "the air is free."

Perhaps the secret is that those responsible have at all times been not only willing, but anxious to confer with interested and experienced men. The December conference is just another proof of that attitude.

Clubs and Light Planes

This month sees the announcement of more than one light plane, designed for the use of clubs and individuals who desire to get in their hours in the air. This quick meeting of the public demand is simply a demonstration that the industry is on its toes and watching the buyers. Unquestionably there is a market here for planes of the type that have proved good sellers abroad. Price, conceding quality, is a consideration, especially with a group of young men.

These planes do not take the place of others now on the market. The buyers will be the same class that bought rebuilts and patched up cracked-up jobs. As regulations tighten up, and eliminate the air-worthless crates, new planes come into the market to supply the ever present demand for a moderate priced ship.

Phone For Passenger Rates

Air-Mail Schedules

AIRWAYS

Air Travel Information

Air-Express Schedules

† Express
*† Express and Passenger
Light face type —A. M.
Bold face type —P. M.

†Rt. Cam-17, New York to — NATIONAL AIR TRANSPORT — Chicago, 726 Miles

Westbound	Close P. O. Day	Close P. O. Nite	Leave Day	Leave Nite	Phone
New York, N. Y.	10:00	**6:30**	11:00	**8:00**	Lexington 8044
New Brunswick, N. J.	12:10	**9:30**	12:15	**9:35**	Nev. 4045
Cleveland, Ohio	3:35	1:35	3:35	1:30	Lakewood 9006
Chicago, Ill.			**7:00**	5:35	Harrison 8234

Eastbound	Close P. O. Day	Close P. O. Nite	Leave Day	Leave Nite	Phone
Chicago, Ill.	6:30	**6:30**	8:00	**8:00**	{ Austin 6248 { Harrison 8234
Cleveland, Ohio	11:17	**11:30**	**12:15**	12:15	Lakewood 9006
News Brunswick, N. J.			**4:45**	4:45	Nev. 4045
New York, N. Y.			**7:00**	6:15	Lexington 8044

*†Rt. Cam-18, Chicago to — BOEING AIR TRANSPORT — San Francisco, 1943 Miles

Westbound	Close P. O.	Leave	Phone
Chicago	**6:30**	**7:50**	Wabash 8084
Iowa City, Iowa	**8:40**	**9:40**	425
Des Moines, Iowa			Maple 707W
Omaha, Nebr.	**10:30**	12:35	Atlantic 9301
North Platte, Nebr.		2:00	29
Cheyenne, Wyo.	**3:30**	4:45	656
Rock Springs, Wyo.	6:30	7:05	415J
Salt Lake City, Utah	9:00	10:50	Wasatch 5569-3321
Elko, Nev.	**10:45**	11:15	1553
Reno, Nev.	**1:00**	**1:45**	195
Sacramento, Calif.		**2:45**	
San Francisco, Calif.		Ar. **4:30**	Kearny 2041

Eastbound	Close P. O.	Leave	Phone
San Francisco, Calif.	6:05	7:00	Kearny 2041
Sacramento, Calif.	8:15	7:45	
Reno, Nev.	10:00	9:00	195
Elko, Nev.	**12:15**	11:00	1553
Salt Lake City, Utah	**3:00**	**3:05**	Wasatch 5569-3321
Rock Springs, Wyo.			415-J
Cheyenne, Wyo.	**7:30**	**7:30**	656
North Platte, Nebr.			29
Omaha, Nebr.	**10:30**	12:30	Atlantic 9301
Des Moines, Iowa		Deliver 1:30	Maple 707W
Iowa City, Iowa			425
Chicago, Ill.		Ar. 5:45	Hemlock 8180

*†Rt. Cam-3, Chicago to — NATIONAL AIR TRANSPORT — Dallas, 989 Miles

Southbound	Close P. O.	Leave	Phone
Chicago, Ill.	3:45	**5:45**	Harrison 8234
Moline, Ill.	6:50	7:20	Moline 738
St. Joseph, Mo.	10:10	10:20	St. Joe-6-0349
Kansas City, Mo.	10:50	11:18	Leeds 1090
Wichita, Kans.	**12:45**	**1:18**	Market 6185
Ponsa City, Okla.	**1:40**	**2:05**	Ponca 9601-F2
Oklahoma City, Okla.	**2:00**	**3:05**	Walnut 4214
Fort Worth, Texas	**4:00**	**5:15**	Prospect 2169
Dallas, Texas		Ar. 5:35	5-7113

Northbound	Close P. O.	Leave	Phone
Dallas, Texas	7:00	**7:45**	5-7113
Fort Worth, Texas	7:00	**8:15**	Prospect 2169
Oklahoma City, Okla.	9:00	10:10	Walnut 4214
Ponsa City, Okla.	10:40	11:05	Ponca 9601-F2
Wichita, Kans.	11:15	11:57	Market 6185
Kansas City, Mo.	**12:15**	**2:05**	Leeds 1090
St. Joseph, Mo.	**2:17**	**2:40**	St. Jos. 6-0349
Moline, Ill.	**4.00**	**5:15**	Moline 738
Chicago, Ill.		Ar. 7:20	Harrison 8234

*†Rt. Cam-2, Chicago to — ROBERTSON AIRCRAFT CO. — St. Louis, 278 Miles

Southbound	Close P. O.	Leave	Phone
Chicago, Ill.	5:20	5:50	Maywood 5010
Peoria, Ill.	6:55	7:25	Peoria 8195
Springfield, Ill.	7:45	8:15	Main 190
St. Louis, Mo.		Ar. 9:15	Avery 2725

Northbound	Close P. O.	Leave	Phone
St. Louis, Mo.	**3:30**	**4:15**	Avery 2725
Springfield, Ill.	**4:50**	**5:20**	Main 190
Peoria, Ill.	**5:40**	**6:10**	Peoria 8195
Chicago, Ill.		Ar. 7:30	

*†Rt. Cam-4, Salt Lake City to — WESTERN AIR EXPRESS — Los Angeles, 600 Miles

Westbound	Close P. O.	Leave	Phone
Salt Lake City, Utah		9:10	Wasatch 7023
Las Vegas, Nev.		**2:25**	Angeles 1786
Los Angeles, Calif.		Ar. **5:25**	Trinity 6754

Eastbound	Close P. O.	Leave	Phone
Los Angeles, Calif.	**6:30**	7:35	Trinity 6754
Las Vegas, Nev.		10:40	Angeles 1786
Salt Lake City, Utah		Ar. **3:20**	Wasatch 7023

*†Rt. Cam-5, Salt Lake City to — WALTER T. VARNEY — Pasco, 435 Miles

Westbound	Close P. O.	Leave	Phone
Salt Lake City, Utah	9:00	9:10	Wasatch 5755
Boise, Ida.	Ar. **12:30**	**1:15**	2901
Pasco, Wash.		Ar. 4:35	31

Eastbound	Close P. O.	Leave	Phone
Pasco, Wash.		6:00	31
Boise, Ida.	9:00	9:20	2901
Salt Lake City, Utah		Ar. **12:50**	Wasatch 5755

*†Rt.-Cam.8, Seattle to — PACIFIC AIR TRANSPORT — Los Angeles, 1,099 Miles

Southbound	Close P. O.	Leave	Phone
Seattle, Wash.		**11:45**	
Vancouver, Wash.	}		
Portland, Ore.	}	7:00	
Medford, Ore.		9:30	
San Francisco, Calif.		**1:15**	Douglas 3301
Fresno, Calif.		**3:15**	
Bakersfield, Calif.		**4:45**	
Los Angeles, Calif.		Ar. 6:15	Vermont 4279

Northbound	Close P. O.	Leave	Phone
Los Angeles, Calif.	**11:00**	12:01	Vermont 4279
Bakersfield, Calif.		1:45	
Fresno, Calif.		**3:30**	
San Francisco, Calif.		5:30	Douglas 3301
Medford, Ore.		9:30	
Portland, Ore.			
Vancouver, Wash.	}	12:00	
Seattle, Wash.	}	Ar. **2:00**	

XUM

AIRWAYS—Continued

Rt. Cam-12, Cheyenne to — COLORADO AIRWAYS — *Pueblo, 199 Miles*

Southbound	Close P. O.	Leave	Phone
Cheyenne, Wyo.		5:30	
Denver, Colo.		6:55	
Colorado Springs, Colo.		7:50	
Pueblo, Colo.		Ar. 8:30	

Northbound	Close P. O.	Leave	Phone
Pueblo, Colo.		4:00	
Colorado Springs, Colo.		4:50	
Denver, Colo.		6:00	
Cheyenne, Wyo.		Ar. 7:30	

†Rt. Cam-9, Chicago to — NORTHWEST AIRWAYS — *Minneapolis, 377 Miles*

Westbound	Close P. O.	Leave	Phone
Chicago, Ill.		5:50	
Milwaukee, Wis.		6:50	
Madison, Wis.			
La Crosse, Wis.		9:30	
St. Paul, Minn.		11:30	Cedar 5693
Minneapolis, Minn.		Ar. 11:40	

Eastbound	Close P. O.	Leave	Phone
Minneapolis, Minn.	1:30	2:30	
St. Paul, Minn.	2:10	2:40	Cedar 5693
La Crosse, Wis.	3:30	4:00	
Madison, Wis.			
Milwaukee, Wis.	5:15	6:00	
Chicago, Ill.		Ar. 7:00	

†Rt. Cam-1, Boston to — COLONIAL AIR TRANSPORT — *New York, 192 Miles*

Southbound	Close P. O.	Leave	Phone
Boston, Mass.	5:15	6:15	Hancock 4612
Hartford, Conn.	6:15	7:35	2-9211
New York, N. Y. (Hadley Field)		Ar. 9:15	Ashland 7750

Northbound	Close P. O.	Leave	Phone
New York, N. Y.	3:00	6:00	Ashland 7750
Hartford, Conn.		6:35	2-9211
Boston, Mass.		Ar. 8:05	Hancock 4612

†Rt. Cam-6, Detroit to — FORD AIRLINES — *Cleveland, 91 Miles*

Southbound	Close P. O.	Leave	Phone
Detroit, Mich.	9:50	10:40	
Cleveland, Ohio		Ar. 12:10	

Northbound	Close P. O.	Leave	Phone
Cleveland, Ohio	3:30	4:30	
Detroit, Mich.		Ar. 6:00	

Rt. Cam-7, Detroit to — FORD AIRLINES — *Chicago, 237 Miles*

Westbound	Close P. O.	Leave	Phone
Detroit, Mich. (Central Time)	2:25	3:15	
Chicago, Ill.		Ar. 6:00	

Eastbound	Close P. O.	Leave	Phone
Chicago, Ill.	7:55	9:30	
Detroit, Mich.		Ar. 12:00	

Rt.-Cam-11, Cleveland to — CLIFFORD BALL AIRLINE — *Pittsburgh, 123 Miles*

Southbound	Close P. O.	Leave	Phone
Cleveland, Ohio		12:15	
Youngstown, Ohio		1:00	
Pittsburgh, Pa.		Ar. 1:45	

Northbound	Close P. O.	Leave	Phone
Pittsburgh, Pa.		2:30	
Youngstown, Ohio		3:15	
Cleveland, Ohio		Ar. 4:00	

† Express
***† Express and Passenger**
Light face type—A. M.
Bold face type—P. M.

Time used is local time, whether Eastern, Central, Mountain or Pacific.

Incomplete data will be filled in as rapidly as authentic information can be compiled.

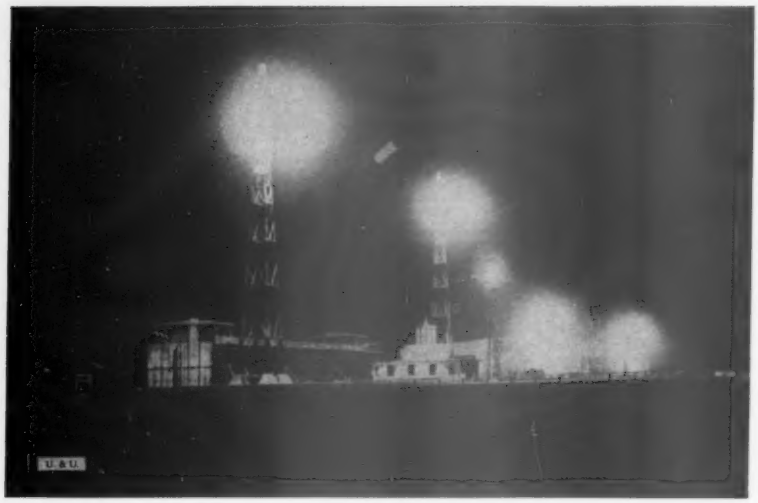
The above schedules of airways information, while carefully compiled, are not guaranteed to be correct, but every effort and precaution is used and will be, from now on, in keeping this schedule up to date. It is proposed, from month to month, to correct and incorporate such further information as may be necessary in keeping pace with the air transport progress of the United States Air Lines.

An attempt has been made to print a schedule which is readable and may be understood by all who have use for air transport, whether air mail, passenger, or express service and is published for the purpose of promoting air transportation and educating our readers so that they may intelligently answer questions regarding aircraft operations when such information is requested.

The present air transport companies now operating and listed above, are primarily trunk lines, but there is a new phase of air transport, heretofore seemingly neglected, springing up throughout the country, namely, Aerial Taxi Service. We hope, in the near future, to be able to print authoritative information on this class of service wherever it prevails with the proper kind of equipment, so that at any time anyone seeking air travel information may refer to POPULAR AVIATION and there find the answer.

Passenger service heretofore neglected by the air transport companies is now available from New York to Boston over the Colonial airways, Chicago to Dallas and intermediate points via National Air Transport, Chicago to San Francisco and intermediate points over the Boeing Airways and from Salt Lake City to Los Angeles over the Western Air Express and from Los Angeles to Seattle via the Pacific Air Express. Phone numbers have been given wherever possible so that people desiring information regarding air travel and transport between any two particular places can be secured through these offices.

We would appreciate comments from our readers as to how we can further make this schedule better suited for their particular needs, as it is the ambition of POPULAR AVIATION to assist in bringing the industry closer to the market.



The illuminated hangar with the lighted antennae masts at Templehofer Field, near Berlin.

Planes for Architectural Study

New and profitable applications of airplanes and air service to the activities of civilization are being made constantly. This summer the Prussian Ministerium of Commerce and Trade organized a flight from Berlin to Stettin as a means of study for the students of the Govermental Building Trades School in Neukoelln. This action is worth knowing in detail.

Aerial photographs had been used for some time in the various courses of the school to great advantage, for they afforded a clear and comprehensive view of the ground, of the location of the various engineering works, of the exterior design of homes and other buildings in relation to the surroundings. This manner of study is certainly an excellent method of developing good landscape and building architects. According to the "Zentralblatt der Vauverwaltung," the ministry also compiled instruction data on industrial and private structures, and has made plans by suitably arranging a number of aerial photographs and enlarging them.

The general principles of the science of aerial photography and its possibilities of application in photographing and studying landscape are discussed in the class rooms. Hence it was an easy matter to step from this point to the actual use of the airplane for the students. The prospective architects, surveyors, etc., were to have an opportunity to make extensive airial surveys of the subjects which they had been studying, thus to vivify the impressions already received and to enlarge and deepen their technical knowledge.

Two F13 Junkers Planes of the Luft Hansa were chartered. By using the railroad one way and the airplane the other way, 16 students could benefit by this undertaking. In order to make the flight as valuable and interesting as possible, a definite altitude of 500 m. (1,640 ft.) was maintained during the flght. At this altitude a comprehensive, yet detailed view of the landscape was possible. Furthermore, by keeping the same altitude, the comparative size of the structures were kept quite uniform, thus aiding the students in correctly judging what they had seen. The pilots directed their planes in such a way that the students received the most advantageous views of the buildings and other objects in the landscape.

Previous to the flight, the route of the trip had been carefully explained to the students by the use of a map and by the projection of aerial photographs. Thereby the advantages of such a flight in respect to underground construction, city building, home location and design, general landscape work, historical features, geographical and geological conditions, etc., were thoroughly presented to the students. During the flight every student used a standard map on which the route of the flight had been drawn.

This experiment by the German officials and students deserves praise because of the great value there is in such an undertaking from the educational standpoint. Such work could well be adapted in many schools in which courses in surveying, landscaping, architecture, history, geology, geography, botany, anthropology, civil engineering, road construction, etc., are given. The airplane is here to stay and the more we apply it to the different professions, trades, educational uses, etc., the more will aviation become of benefit to civilization.

Some people are opposed to aviation and airplanes because they say it is too risky and causes too many deaths and injuries. Let these people compare statistics on accidents in other fields of travel such as railway, automobile, ship, etc. Let them trace the causes of many airplane accidents and they will find that many of them could have been prevented if the parties involved had given proper care to their planes, had observed all rules of safety and handled the airplane as carefully as you would drive an automobile. But when one flies in the wide spaces of the air, there is no track to follow as with the automobile. Yet, one must observe the laws of aviation.

Some time ago a German, an old gentleman, complained to an aviator about the risks that aviators are running and the deaths and injuries that are caused in flying. The aviator laughed and said, "Dear old man, there are many, many people who have died as they laid in bed, but very few people have ever died in airplanes." The Germans are planning to offer flights to other schools as well, as an aid in developing efficient men to carry on the work of the nation.

Student Enrollment Increases

Student enrollment for the course in aeronautical engineering at the Massachusetts Institute of Technology is more than double that of last year, according to registration figures given out by the faculty. Total now enrolled in the classes is 163, an increase of 133 per cent over last year. The increase is attributed to the dramatic appeal of the recent spectacular achievements in aviation and the growing conviction that technical training is essential.

Fairchild All-Purpose Cabin Monoplane

A five-passenger cabin monoplane designed and manufactured by Fairchild Airplane Manufacturing Company, Farmingdale, L. I., N. Y.

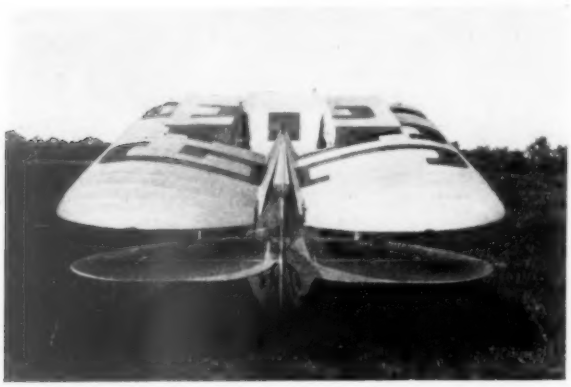
Specifications

General

Type	Cabin
Use	All Purpose
Length, over all	30 ft. 11 in.
Height, over all	9 ft.
Span	44 ft.
Height, folded	9 ft.
Span, folded	13 ft.
Chord	7 ft.
Crew	1
Passengers	4
Control	Stick, Single

Power

Type	Whirlwind
Make	Wright
Rated Horsepower	220
Cooling	Air
R. P. M.	1,850



Wing Data

Curve	Fairchild
Sweepback	None
Dihedral	1°30′
Angle of Incidence	2°30′
Spread	44 ft.

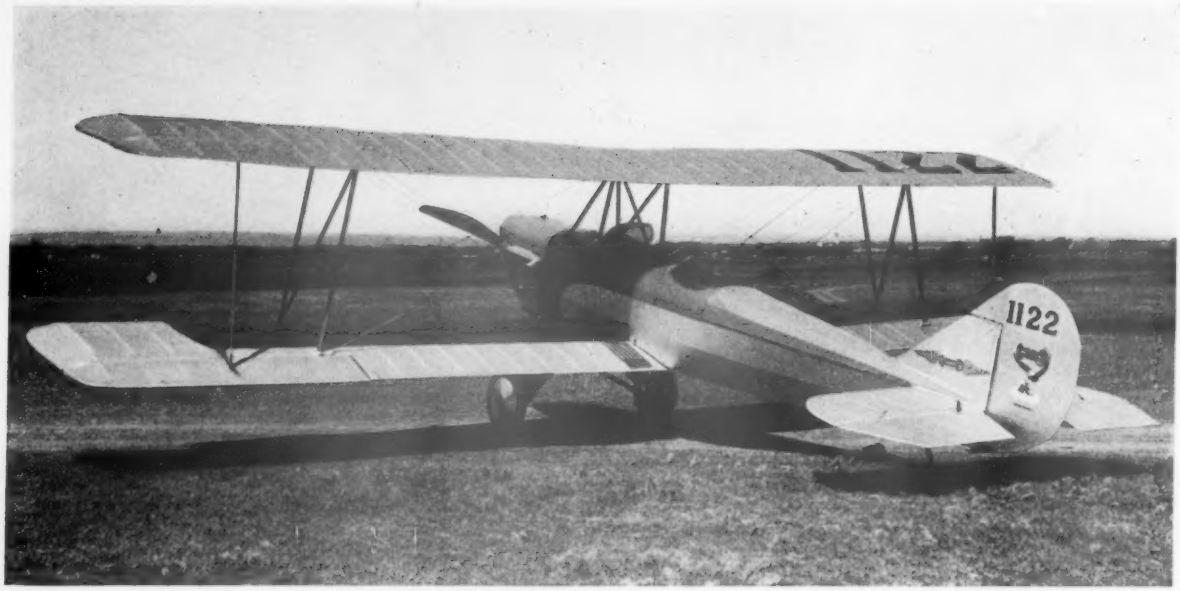
Areas

Area of Wing, Including Ailerons	290 sq. ft.
Area of Ailerons	21 sq. ft.
Area Horizontal Stabilizer	26.1 sq. ft.
Area Elevator	18.1 sq. ft.
Area Rudder	10.2 sq. ft.
Area Fin	5.1 sq. ft.

Performance

Power per Horsepower, loaded	16.4 lbs.
Pounds per sq. ft., loaded	10 lbs.
High Speed	122 m.p.h.
Cruising Speed,, approximately	103 m.p.h.
Climb in first minute, loaded	565 ft.
Climb to 10,000 feet, loaded	25 min.
Cruising Range	620 miles

This machine is available in land type as illustrated and as a seaplane with slightly different specifications. Specifications on types offered include oleo shock absorbers, fully equipped instrument board, wide vision pilot and passenger compartment.



The Alexander "Eaglerock"

A three-seater tractor biplane designed for commercial use manufactured by Alexander Aircraft Co., Denver, Colo.

This company manufactures this plane with long wings for altitude work and short wings for sea level work, in addition to the combination wing here specified.

Specifications

General

Type	Combination Wing, Long Upper, Short Lower, Open
Use	Commercial
Length, over all	24 ft. 11½ in.
Height, over all	9 ft. 11 in.
Span, over all	36 ft.
Chord	6 ft.
Crew	1
Passengers (less pilot)	2
Control	Single, Stick

Power

Type	0x5
Make	Curtiss
Rated Horsepower	90
R. P. M.	1,400
Cooling	Water

Wing Data

Curve	Clark-Y
Sweepback	None
Dihedral, upper wing	3½ in.
Dihedral, lower wing	3½ in.
Stagger	14 in.
Gap	69 in.
Angle of Incidence, upper wing	2°
Angle of Incidence, lower wing	2°
Spread, upper wing	36 ft.
Spread, lower wing	32 ft.

Areas

Upper Wing, Including Ailerons	216 ft.
Lower Wing, Including Ailerons	192 ft.
Ailerons	Not Balanced

Weight

Empty	1,280 lbs.
Fuel, gals.	46 gals.
Useful load	760 lbs.
Ready to fly, with load	2,120 lbs.

Performance

Pounds per Horsepower	26.6 lbs.
Pounds per square feet	6.43 lbs.
High Speed	100.6 m.p.h.
Cruising Speed	95 m.p.h.
Climb to 1,000 feet, loaded	514 ft. per min.
Service Ceiling, loaded	11,500 ft.
Cruising Range	464 hrs.

This page, and the other side, is the second of a complete series covering aircraft manufactured in the United States. Every month POPULAR AVIATION will publish the specifications of different aircraft in a standard form, and the entire series will afford you a master reference guide of the types and make of aircraft in the United States. The selection printed every month is chosen at random by POPULAR AVIATION and no attempt is made to publish the specifications in any order, alphabetical or otherwise.

XUM

Model Airplane Construction

Lange 262 4/5 Seconds Duration Model

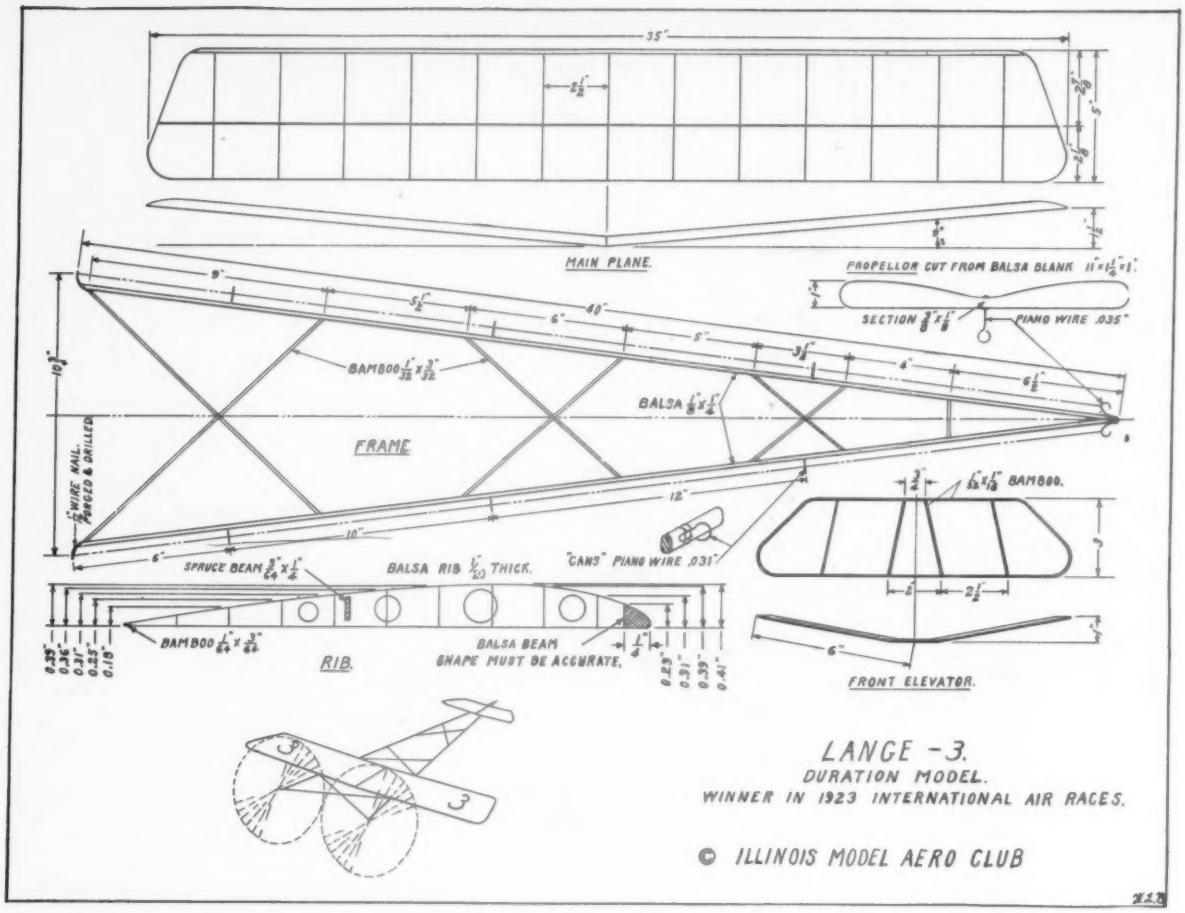
THE Lange 3 is a very good representative type of the developments of the Illinois Model Aero Club in fifteen years of model designing, building and flying.

The "cans," X bracing, single wire bearings, propeller shafts, elevator, A frame, propeller and wiring design, and extreme light weight with requisite strength, are distinctively this Club's developments, and account in the most part for its unsurpassed performance.

Balsa beams ¼"x⅛" are slightly rounded at the corners, sandpapered very smooth and doped with banana oil or airplane dope. The perforations are made in the beams at the places indicated in the drawing for inserting the bamboo braces. Joints are made with Ambroid (essential) which if done carefully, will not require binding. The front wire hook is bent from No. 15 wire to form, as shown and Ambroided and bound with fine silk threads onto the nose of the frame. The "cans" (rubber retainers are absolutely essential) are bent to shape from No. 10 wire and Ambroided and bound in place. They are left open at the top so that the rubber may be slipped in place after winding. The rear bearings are made of 1/16" nails forged and drilled, bound and Ambroided in place, taking care not to allow bearing to project further than 5/16" from the beams.

The elevator is next made from bamboo as drawn. The tips are made from a bamboo piece a little larger than 1/16"x1/16", which is bent to shape over a candle flame and then very carefully split flat wise making both tips identical in shape, and finished with sandpaper. Joints are Ambroided and slightly bound. The frame is then covered with Japanese silk tissue paper (ordinary tissue is not strong enough) using banana oil or dope for cement and drawing the paper smooth and taunt. The angles of incidence and dihedral are then bent in the elevator, a V in front and a flat V in the rear, using extreme care to get the correct shape as illustrated. This is essential, as the elevator is the most sensitive part of the plane.

The wing is the most important part of the model. One cannot be too careful in its construction. The ribs are cut to the template from 1/20-in. Balsa and lightening holes and hole for rear spar drilled and then assembled on the ½x3 3/64-in. rear pine spar, which has been lapjointed at the proper angle to give the required



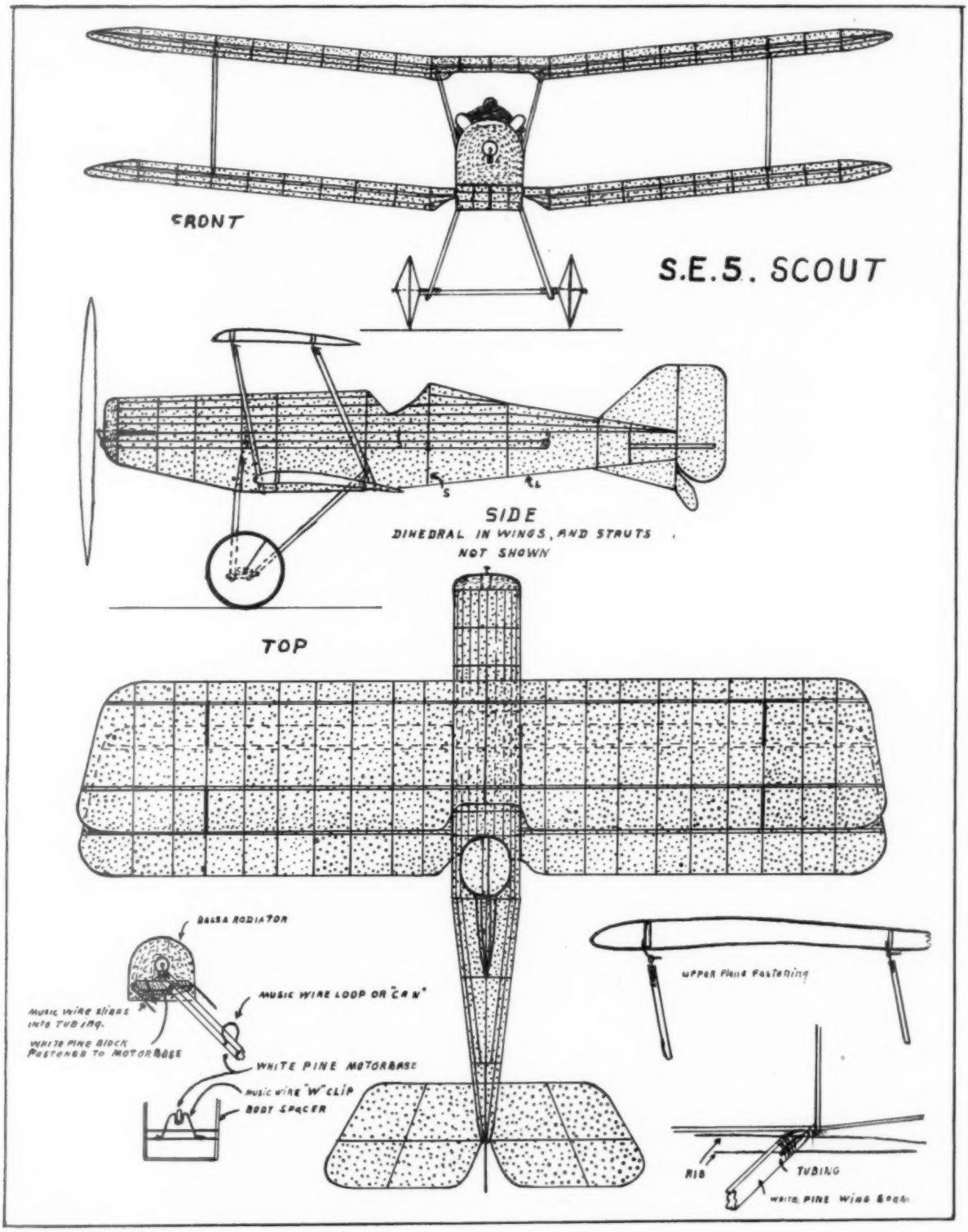
dihedral angle. The front spar is then very carefully shaped to the profile of the entering edge of the wing section using a template for the curve. It is joined at the middle at exactly the same angle as the rear spar. Shallow grooves are filed in the spar into which the ribs are butted and Ambroided. The rear spar is likewise Ambroided in place. The wing frame is now allowed to dry perfectly flat (ribs in line). The wing tips are made in the same manner as the elevator tips were made, and then the bamboo trailing edge is Ambroided in place, slightly sinking it into the rib tip for a secure joint. Bear in mind to use Ambroid sparingly, but effectively, in fact, this is true of all material, in order to have the necessary strength with minimum possible weight. The wing is then covered, preferably the top first, cementing with dope and drawing each section of the paper taunt, particularly along the wing, rather than across it, in order to preserve the section. Be more careful at the tips to prevent the paper from wrinkling. Give the finished upper covering a coat of dope consisting of one part banana oil or dope to five parts of acetone. Next cover the bottom, which is more easily done, trim the edges with fine sandpaper and give the whole wing two coats of very diluted dope. Too much dope will warp the wing—too little, permit the paper to sag and leave it fuzzy.

Popular Aviation wishes to express its indebtedness to Mr. Paul Garber, of the Smithsonian Institution, Washington, D. C., for much of the material appearing in the early issues of Popular Aviation relating to the building of model airplanes.

Next and last comes the propellers, the success or failure of extraordinary performances. They are cut from 1-in. to 1¼x11-in. balsa blanks. These are Wright true pitch type. Lay diagonals on the 1¼-in. face and then saw to these lines, allowing enough for the hub at their intersection. Drill a fine true hole for the shaft, exactly in the center, then roughly carve the faces on the propellers, being sure to make them opposites. Balsa is very easy to carve with a sharp knife. Finish slightly convex with sandpaper. Next whittle the reverse four sides and finish slightly concave with sandpaper. Do not overdo the curvature. Trim the tips slightly and the hubs somewhat more. Finish with medium and very fine sandpaper and test for balance in the A frame bearings. When perfectly balanced, dope them. Bend the propeller shaft into shape and insert in the hole in the propeller with Ambroid and bend the end over to anchor it, but not indent the hub. Ambroid securely, using extreme care to keep the shafts true. Slip a few washers onto the shaft.

Four strands of 3/16-in. flat or 6 strands of ⅛-in. flat rubber are needed. Allow a little slack. S hooks are used at the front of the model to facilitate the removing of the rubber for winding.

S-E-5 Scout Scale Model



S-E-5 Scout Scale Model

Building Instructions

The S. E. 5 Scout was probably the most famous plane developed during the war. This tiny plane having a wing span of scarcely 27 feet with a 180 horsepower motor showed a remarkable climb and a high speed of over 140 miles per hour.

The S. E. 5 has all the properties necessary for a successful flying miniature. The three degrees of dihedral (the angle at which the main planes on either side of the fuselage meet) is necessary to a flying model since it counteracts the tendency which the rotation of the propeller has to turn the model over. The large distance between the entering edges of the main planes and the front of the model makes the center of lift come well back which leaves a good flying model with little or no balancing weight. Also the propeller in proportion to the rest of the machine is quite large, permitting the model to be built to scale throughout and yet retain the most excellent flying properties.

Before building this model it is advisable to make a full size drawing of the model to use as a pattern as the sticks are formed. The drawing furnished is entirely to scale. Because all of the little sticks are shown it may lead to some confusion. It must be remembered that the model is covered as represented by the dots. It is considered in this drawing that light will pass through one thickness of paper. Parts of the model beneath two thicknesses of paper are dotted. In the front view of the wing the entering edge is the heaviest line. In the side view the part of the wing containing the dihedral angle is not shown, for clearness. The propeller is shown only in the side view as it is of the usual type of scale model propeller carved from a Wright blank.

The Body: With the exception of the nose and motor-stick, all of the wood members of the body are bamboo. The upper longerons are tapered from 1/16" square at the nose to 1/32" square at the tail. The lower longerons are 1/16" sq. at the nose to a point 1" behind the rear of the landing chassis and from there they are tapered to 1/32" sq. at the tail. This is done because of the strain where the landing chassis is attached. The front spacer is 1/8" wide by 1/16" thick, the next one is 3/64" wide by 1/16" thick. and they are cut smaller as the tail is approached. All the joints are glued and bound with silk thread. The bamboo strips which bring out the body form are very thin, in fact are almost shavings. The center wing struts bend at the top longerons and run to the lower longerons. The rudder post and the diamond shaped tail skid is all one piece of bamboo, which can be bent to the desired shape by holding near a candle flame. The horizontal tail and rudder are made as light as possible. Both are covered on one side only and are left undoped.

The Landing Chassis: The landing chassis is made very strong. The axle and struts are made very strong by using bamboo 3/16" wide. These are all streamlined. For wheels, eight 2½" discs of mechanical drawing paper are cut on a radius or half way through and are overlapped and glued to form a slight cone. For strength glue two cones, one inside the other, to make half a wheel. Brass washers are glued inside each of such double cones at the center to form a bearing for the music wire axle (about No. 14 wire). Two such double cones are then glued together to form a wheel. The wheel should be spun on an axle and trued before the glue dries.

Nose and Motor-stick: The detachable motor-stick is made of pine 15" long by 3/32" thick. It is ¼" deep. There are two wire eyelets on it to pass the rubber through, as shown. To the front of the motor-base a strong bamboo crosspiece is bound. This crosspiece has bound on either end two wire pins which point toward the rear. Each of these wires slide into an aluminum tube (made of sheet aluminum) which is at the front end of either top body longeron. This holds the motor-base in place at the front. The motor-base is held fast in the rear by means of the wire wing clip shown with its bracings in the lower left hand corner of the drawing. This "W" clip is placed between the first two body spacers to the rear of the seat. Thus the motor-base can be put in and removed from the clip by inserting the finger in the seat. The nose or radiator is of balsa wood and is attached to the cross-piece at the front of the motor base by means of little pieces of bamboo. The optional exhaust pipes which extend from the engine cylinder blocks (shown only in the top view) to the rear of the cockpit can be made of soda fountain straws.

The Wings: The wing beams are made of pine and the entering edges, trailing edge and ribs are of bamboo. The front wing-beams are 3/64" thick by 5/16" deep. The rear wing-beams are 3/64" thick by as deep as the section will allow. They are all set edgewise for strength. The wings are detachable. Each center strut has a wire loop bound on its end. Four wire pins are bound on the top wing beams and these are slipped in or out of the wire loops on the top of the center struts. (Shown in upper right hand detail.) Each lower wing has bound on its side at the body end an aluminum tube. Next the body where the beams of the lower wing goes, large straight pins are bound which project outward and slip into the tubing on the wing beams. The lower wings are held on by means of rubber bands stretched beneath the fuselage.

Papering: The entire machine is papered with Japanese Imperial silk tissue paper. To stick the paper on use LePage's glue, diluted with an equal amount of banana oil. The papering of the body is given one coat of dope which is composed of one-half banana oil and one-half acetone. The wings are given one coat of acetone. The tail plane and rudder are not doped because it would warp them and interfere with the flying of the model.

Millionaire Cadet

Walking into the United States army recruiting station at Camden, N. J., October 24, Alexis Felix du Pont, Jr., son of the vice president of the E. I. du Pont de Nemours Company, of Wilmington, Del., took the oath of allegiance. He was sent to Brooks Field, near San Antonio, Texas, where, with 1,300 other young Americans, he will receive the army course in aviation.

Young du Pont is 22 years old. Three months before his enlistment he went to Boston and successfully passed the necessary tests, leaving Princeton University, where he has been a student, without completing his course.

XUM

An A B C of Aviation

Airplane Instruments

Although an airplane can be flown without the use of a single instrument, the absence of these aids to flight places too much dependence on the judgment of the pilot. Instruments may be divided into two classes, engine and navigation instruments.

Engine instruments are an aid to the pilot in the operation of the power plant and substitute foreknowledge of coming trouble for the exercise of judgment.

Navigation instruments are necessary for flight over strange territory and afford the experienced pilot an exact check upon his "feel."

Ordinarily, the instrument board of the modern airplane is so laid out that the engine instruments are on one side of the board (generally the left) and the navigation instruments on the other side.

The common engine instruments are:

Pressure Gauge for Gas.
Pressure Gauge for Oil.
Gasoline Level Gauge.
Radiator Thermometer.
Tachometer.

The ordinary navigation instruments are:

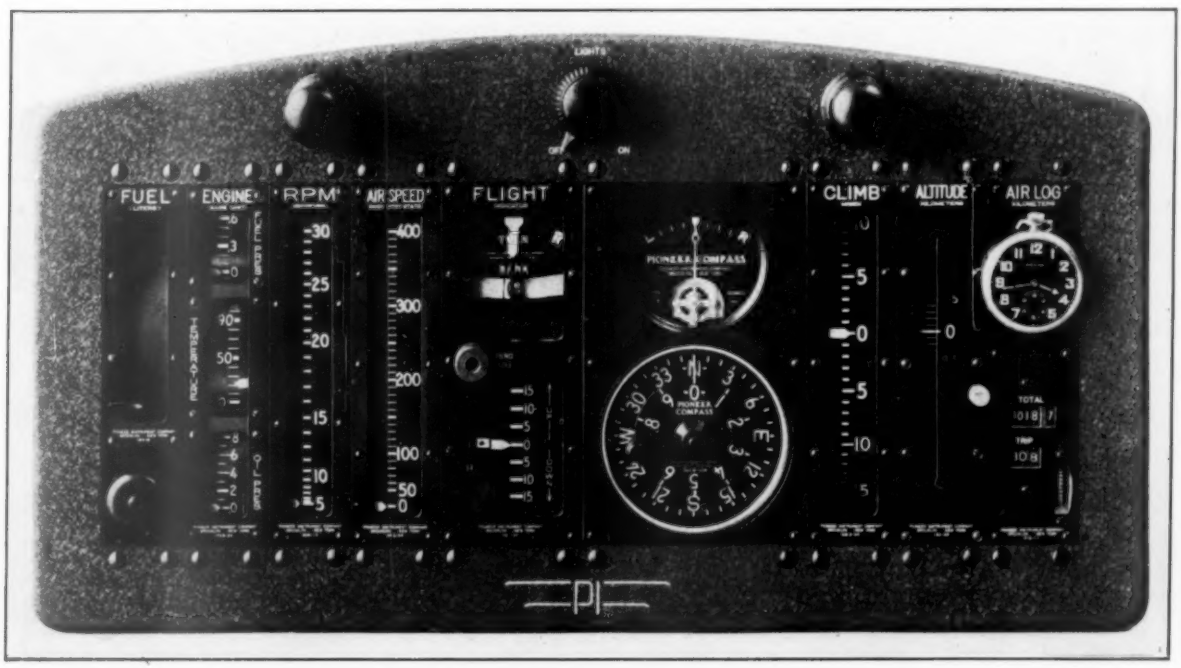
Compass.
Altimeter.
Inclinometer.
Air Speed Indicator.

The gasoline pressure gauge measures the air pressure in the gasoline tank in the case of air pressure feed systems, or the gas pressure near the carburetor, in the case of pump force feed systems. Loss of pressure means coming engine failure, making this gauge an important one to watch. A copper tube runs from the gas tank, or gas line, to the instrument on the board. This instrument consists of a dial and a pointer. The pointer is attached to a Bourden tube, a delicately hinged, curved and eliptical tube which has a tendency to straighten out under pressure. The movement of the tube is communicated to the pointer by means of a small pinion. Gasoline pressure gauges are not required in the case of gravity feed tanks.

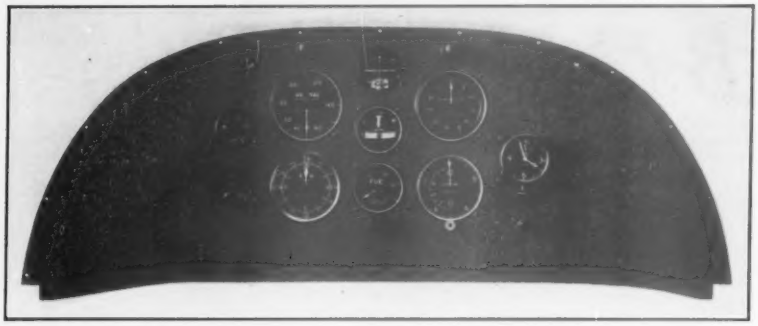
The two feed systems referred to are for installations where it is necessary for the gasoline to be forced to the carburetor by means of pressure.

Gasoline may be forced from the tank to the carburetor by means of air pressure in the tank. A pump is provided in the cockpit so that this presure may be supplied. Some manufacturers are discontinuing this type of feed because in minor crashes the gas tank seams open up and the cockpit is flooded with gas because of the air pressure, often causing a disastrous fire.

Fuel pumps are used in place of the pressure feed. The gasoline is sucked from the tank to the pump and from the pump it is forced to the carburetor. The gauge used is practically identical with the air pressure system gauge, except that the line is connected near the carburetor.



Special instrument board of vertical instruments. Note how easily read. (Courtesy Pioneer Instrument Co.)



Instrument layout used in Travel Air. (Courtesy Pioneer Instrument Co.)

The oil pressure gauge works on the same principle as the gas pressure gauge. The copper tube to the dial runs from some point in the oil system of the engine to the indicator. The figures generally indicate pounds pressure per square inch, and two types of dials are generally supplied, from one to 60 and from one to 120.

The gasoline level guage shows the amount of fuel contained in the tanks, and is generally mechanically operated, by means of floats and a pulleyed system.

The engine temperature gauge is primarily intended to warn the pilot of engine trouble due to overheating. It is an aid to the most efficient operation of the engine. It also warns the pilot when gliding or diving a long distance in cold weather how cold the engine is becoming.

The instrument is rather delicate, consisting of a thermometer bulb and a length of capillary tubing which connects with the dial. The bulb is inserted in the water in the radiator at a given point or at a selected spot in the oiling system, the dial reflecting the temperature of the engine cooling or oiling system.

The thermometer may be of the Fahrenheit or Centigrade type, the latter being preferred, as corrections become easier with increased altitude. Water boils at 100 degrees Centigrade at sea level, but at 20,000 feet it will boil at 83 degrees. Roughly speaking, the correction to be made with a Centigrade thermometer is one degree for every thousand feet of altitude.

In order to change from Fahrenheit to Centigrade scale, or vice versa, using the following formulae:

Centigrade equals 5/9 (F minus 32).
Fahrenheit equals 9/5 (C plus 32).

The tachometer shows the revolutions per minute of the engine, and is composed of a gear-driven flexible shaft which is connected to the dial on the instrument board. The gear is driven from the engine and is connected at the shaft end when possible, so that there is no necessity for ratio gears.

A sudden drop in the number of R.P.M.s indicated by the dial warns the pilot to look for engine trouble and to inspect the other instruments at once to diagnose the trouble.

The air speed indicator is a sensitive pressure gauge which indicates in terms of air speed the air pressure at the instrument head, which is generally mounted on the wing, outside the slip stream. A Pitot tube is most frequently used, and some times the Venturi tube. This is a double funnel arrangement, two small funnels being joined at the small ends. At the apex is small tube running to the instrument. The force of the air blowing through the funnel produces a suction on the tube which is communicated to the instrument. The Pitot tube runs by pressure, instead of suction. Sometimes both are used.

The instrument is of value in giving more information than simply the amount of distance traveled in a certain time. Every ship has a safe flying speed, the lower range indicating an approach to the stalling point and the highest point showing a dangerously steep dive. Thus, the reading of the air speed indicator is an index of the fore-and-aft angle of the plane and watching the indicator facilitates maintenance of the correct longitudinal attitude.

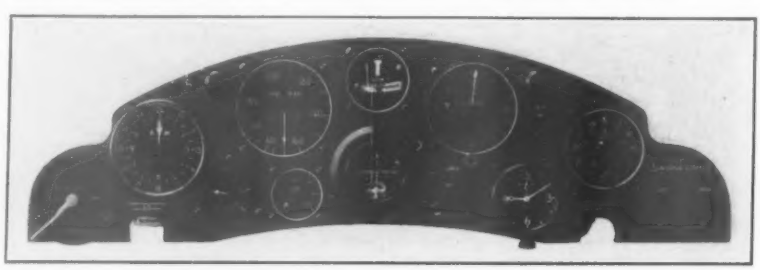
The indicator must be corrected for flight at different altitudes and in other ways to estimate ground speed. For practical purposes two per cent of the reading must be added for every thousand feet of altitude. Also, the speed of the wind has to be added or subtracted, depending on wheather it is a tail or head wind, in order to obtain the ground speed.

The altimeter is simply a delicate box aneroid, or barometer. It is connected to a dial which shows the reading in feet instead of the usual reading by inches shown on a barometer scale. The most important thing to remember about the altimeter is that it does not indicate the height of the plane above the earth, but its height from sea level. For this reason most of them have what is called a zero adjustment. This is a screw which can be turned, when the plane is on the ground, until the pointer registers at zero. An airplane on the ground in Chicago will show an altimeter reading of 600 feet, because that is the height of Chicago above sea level. The zero indicator can be turned so that it will register zero on the ground, or it can be left at 600, if the pilot will bear in mind that a correction of 600 feet must be made from every reading.

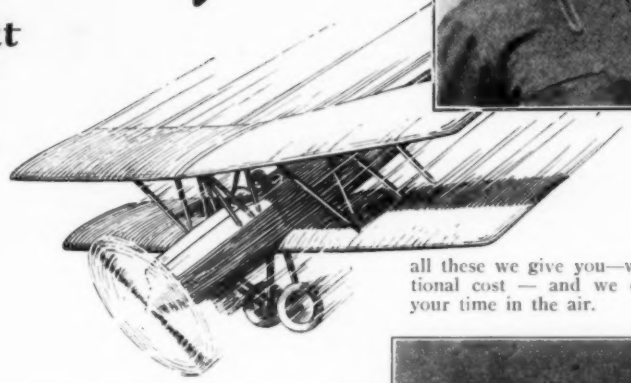
Compasses are of two types, magnetic and earth inductor. Compasses require frequent adjustment and compensation. In one type the compass is composed of a card floating in alcohol, on a jeweled bearing. Suspended below the card are two small magnets, parallel to each other. These turn the card to the magnetic north. The entire device is made so that most of the

(Continued on page 64)

Instrument board used in Fokker Universal. (Courtesy Pioneer Instrument Co.)



ZOOMING to Fame *and* Fortune *in* Aviation



by R.J.Bassett

Chief Pilot

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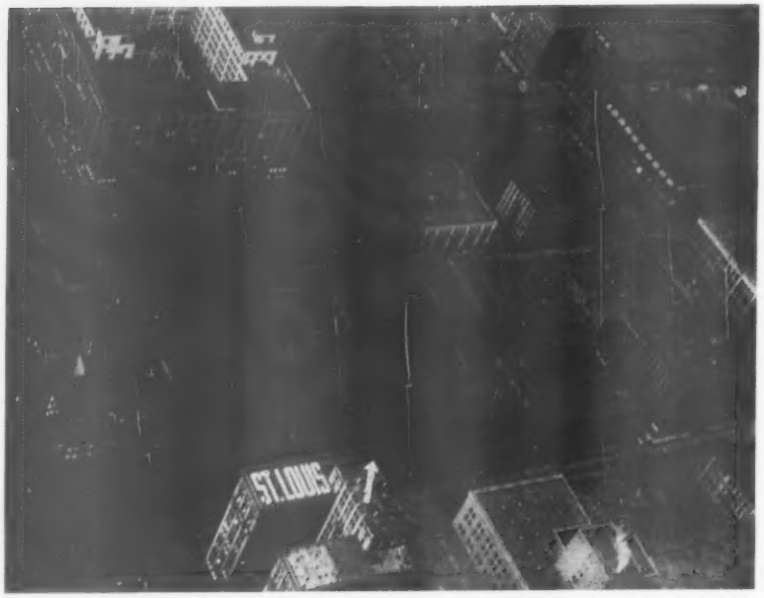
Airport News

Electric Airline Marker

A huge airline marker in the form of an electric lighted arrow has been erected on the roof of the Boatmen's Bank Building in St. Louis. The marker is arrow-shaped, and fifty feet long, the head being a 13 foot triangle. It points directly to the Lambert-St. Louis Flying Field.

Along the shaft of the arrow, which is five feet wide, is painted in black letters—"15 Mi. to Field." On the roof of the west wing of the building the name "St. Louis" has been painted in letters 32 feet long.

Large reflecting lights have been installed so that the arrow and the city name will be visible from a height of 2,500 feet. The management of the building keeps the markers clean and painted to insure the maximum visibility.



Illuminated marker on the Boatmen's Bank Building in St. Louis.

Chicago Starts New Airport

The officials of the South Park Board in Chicago have made the first move toward the realization of the lake front airport project by authorizing the commissioners to acquire from the city of Chicago a site between 16th and 31st streets. An artificial island will be made in the lake at the location secured and a comprehensive scheme for installation followed.

Rhode Island Gets Airport

One of the most extensive air meets ever attempted in New England marked the dedication of Rhode Island's first airdrome Oct. 14, 15 and 16. This state has long been avoided by flyers because of its lack of landing fields, but it is hoped that the three days of flying exhibitions will stir up enthusiasm to the point of the establishment of several more fields and bring Rhode Island abreast of the other New England states in aviation facilities.

The American Legion and the Providence Town Criers were responsible for the affair, which had this end in view. Harland F. Banks, who promoted the big aviation pageant at Springfield, Mass., directed the Providence pageant. As many as a hundred flyers were introduced to Rhode Island's first airport, at Buttonwoods, a suburb, on the direct line between Providence and Boston, a route frequently taken by pilots on the New York run. It has runways in four different directions and is 1500 by 1200 feet in size. One hundred prizes were offered in the various events of the meet.

Boston's Second Airport

Boston's second airport, Dennison Field, on Quincy Shore Drive, went into commission this fall when pilots Allan P. Bourdon and Franklin T. Curt soared aloft in Waco biplanes, accompanied by student flyers. The opening was without formality, pilots, students and mechanics being on the field at an early hour. It marks, however, the successful culmination of several months of building inactivity. The 2-acre landing field is entirely of artificial construction, the earth having been dredged in from the bed of the Neponset river.

According to announcement by the Dennison Aircraft Corporation, owners of the airport, of which Harold T. Dennison is president, approximately 100 students, half of them residents of Boston and vicinity, have applied for training. Pilot Kurt, former president of the Tech Aero Club, will have charge of the ground training and Pilot Bourdon, aided by Kurt will give the students their work in the air.

Miss Amelia Earheart, the only licensed woman pilot in this section of the country, is also a member of the training staff. Though but 29 years old, she has been a licensed pilot for ten years, and for many years held the world's altitude record for women. Several other flyers will shortly be added to the training staff. The equipment consists of six Wacos and two Kinners, one of these being flown from California by President Kinner of the Kinner Corporation. The Wacos were flown down from the factory at Troy. In addition to its land fleet the corporation has acquired a flying boat for students who wish instruction in seaplane flying, a small cove not far from the field being used as a harbor.

Besides flying instruction, the Dennison corporation will give joy hops and provide an aerial taxi service for the public, the charge for the latter being so low that it comes within the financial range of the average individual.

Headquarters offices and the main hangar are all housed under one roof and the building cost approximately $50,000, and it will house five planes. There is a large general office, a pri-

XUM

vate office and an airplane showroom in addition to the hangar. The interiors, walls and ceilings are painted with air scenes and on the floor above the hangar is a classroom for students. In the hangar will be housed the corporation's own fire department, consisting of an automobile chemical engine, manned by trained men.

Within a few weeks the present landing field, approximately 600-800 feet wide by 1,500 feet long will be extended to a length of 2,200 feet. Later extensions will be made to an ultimate 4,000 feet length.

Extra Pacific Fields

Plans have been perfected whereby emergency landing fields every 30 miles are to be maintained with an attendant on the airway between Portland and San Francisco. This word has been received from the United States department of commerce by the Pacific Air Transport, Inc., who operate mail and passenger service between Seattle and Los Angeles.

The government will drain, level and mark the landing fields. Each will have a runway 2,500 feet long in two directions. The P. A. T. company has given the government engineers maps of the landing fields, over which they have maintained flying service during the past year.

An attendant will be kept at each of the government landing fields to assist flyers. Each will have an automobile which can be used to transport the mail to a railway in case a plane is disabled.

Because of the extra hazardous flying conditions between Roseburg and Redding, the P. A. T. intends to ask the government to survey landing fields every 15 miles between those points. The operating company will offer to maintain every other field if the government will survey, drain and mark them. Radio beacons will also be installed at each field. This company has also recently made Tacoma a regular stop for air mail.

Round Hills Leased

Col. Edward H. R. Green has leased his great Round Hills airport at South Dartmouth, Mass., to the United States Army for the nominal sum of one dollar a year. Development of the flying field, which, for the aforesaid dollar will be used by the army aviation service as an experimental station, will be along lines recommended by army engineers. This leasing of the property will in no way affect Col. Green's tenancy of it, nor of the various activities, including the aeronautical experiments that he is sponsoring. Army experimental work must be carried out on government property, so that the lease held by the government will give the field an official status and prevent its being used for commercial purposes.

New England Airport

Among the new concerns just chartered under Massachusetts laws is the Gardner Airport, Inc., of Gardner, Mass., to give instruction in flying, flying exhibitions and "do all things designed to promote the art of aeronautics." The capital is $50,000, and the incorporators are Charles H. Hartshorn, Albert H. Stone, Chester L. Pearson, David R. Collier and Carl A. Ware, all of Gardner.

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Scenic Route Planned

The Scenic Airways, Inc., with Mr. J. Parker Van Zandt as general manager, is soon to open an airline over the Grand Canyon of Arizona. The company plans to carry passengers on short sight-seeing trips and will later extend the service across the canyon with side trips to the Painted Desert, Rainbow Bridge and other points of interest. The B. Russell Shaw Company of St. Louis is building an airport for the company under rather unusual conditions.

The airport is seven thousand feet above sea level and is situated at the foot of Red Butte Mountain. It comprises 768 acres and has three runways, the shortest one, running east and west, being 4,300 feet long. The other two are over a mile in length. The hangar is of steel frame construction, 50 feet wide and 90 feet in length. The field is equipped with night landing lights, oil house, executive offices, passenger waiting room, shops and sleeping quarters for pilots.

Innumerable difficulties were encountered in constructing this field, such as lack of labor and materials. All the water used had to be hauled ninety miles, from Flagstaff, Ariz., and the steel trusses had to be trucked eighteen miles over narrow, winding roads. Sand was quite scarce and exhorbitantly priced. Before construction was started it was necessary to kill off innumerable prairie dogs and fill their burrows. The Department of Agriculture co-operated with the Shaw company in the last task, using a poisoned grain.

The field has been used in its incomplete state for over a month, but it will be in full operation before the end of November. When finished it will be one of the largest and most completely equipped fields in the country.

Meet Opens Airport

An elaborate program of air races formally dedicated Whittall Field, North Grafton, six miles from Worcester, Mass., the latter city's new airport, on October 8th. Pursuit ships of the army, navy and marine corps staged a high speed race and there was an air pageant in which a considerable number of planes participated. There were three groups of commercial plane events; for planes under 100 horsepower; for planes over that engine strength and an open handicap race. Service ships had races for pursuit and training types. Prizes totalling $2,500 and several trophies were awarded.

The new airport is designed to serve the city of Worcester and was constructed at a cost of $75,000 by the two Whittal brothers and named in honor of their grandfather, Matthew John Whittall. They expect to operate a commercial flying service from the field.

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Model Airway

AN equipment loan to finance the purchase of three-multi-motored, modern passenger carrying airplanes to be operated on a model passenger airway between Los Angeles and San Francisco by the Western Air Express has been authorized by the trustees of the Daniel Guggenheim Fund for the Promotion of Aeronautics. It is the intention of the Western Air Express to establish regular service on this air line early next year on a three hour daylight schedule over a route, which in accordance with the Fund's policy, must be approved for passenger transport by the Aeronautics Division of the Department of Commerce.

This is the first equipment loan to be made by the trustees in accordance with the recently adopted policy of the Fund to authorize such loans for the purpose of encouraging the development of passenger carrying air lines.

Equipment loans are and have been used extensively in the development of American railroads and street railways and the trustees of the Fund in their plans to assist passenger carrying air lines have adopted the same principles of financing as have been found successful in railroad equipment purchases.

Trustees of the Fund believe that the equipment loan plan will not only provide equipment for demonstration of performance but will also provide a concrete example of aeronautical financing upon which further financing can be developed. The purpose of the loan is to finance the purchase of modern multi-motored planes of maximum safety and comfort.

The trustees desire to state in connection with the equipment loan that the Daniel Guggenheim Fund has no commercial or other interest in Western Air Express and is related to that company only in the capacity of financing the purchase of the equipment to be used on the selected route.

Planes purchased with money obtained under the equipment loan plan will be of the most modern, multi-engined design of maximum safety and comfort. They will have cruising speed of about 120 miles an hour with a capacity cargo of nearly two tons.

The airline distance between Los Angeles and San Francisco is 365 miles and the time necessary for flight over this route will be approximately three hours. Planes will leave either terminal at 10:30 o'clock in the morning and will arrive at the other terminal at 1:30 o'clock in the afternoon. Airports in both cities are situated within 30 minutes from the business sections so that office-to-office movements may be completed within four hours, as compared with the 13½ hours now required by railroad.

This arrangement, it is pointed out, will permit business men in either city to attend their offices in the morning, disposing of important details, and then leave for the airport to keep 2 o'clock afternoon appointments in the other city. By combining this service with return by fast night trains the round trip can be completed in a period of 24 hours.

Western Air Express will provide the latest conveniences for its passengers on this airline. Lunch will be served in the air and magazines, the latest editions of newspapers and radio entertainment and market reports will be available.

Planes will be of such design that they can remain in the air with one engine disabled, thus practically eliminating the possibility of forced landings.

The aeronautics division of the Department of Commerce, through William P. McCracken, Jr., Assistant Secretary of Commerce for Aeronautics, will co-operate with Western Air Express by installing on this model airway every aid to aerial navigation now available.

Negotiations will be entered into immediately with American aircraft manufacturers in order to purchase the most modern and up-to-date airplanes for this route. Because the Los Angeles-San Francisco line is designed as a practical experiment in aerial passenger carrying it is believed that all aircraft and accessory manufacturers in the United States will co-operate to make this an outstanding success so that it will be an incentive for expansion in this modern field of transportation.

It has been repeatedly pointed out that aviation must progress through the development of commercial flying. Passenger air lines in Europe have been

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aided very greatly by state financial assistance. In the United States, however, air transportation has been developed primarily without direct government subsidy as exemplified in the air mail service, all the lines of which have been, or will be, turned over to private operators. America, on the other hand, is better suited to aerial passenger service than Europe, since distances in this country are greater and the use of airplanes will materially reduce the time necessary to travel between the largest cities. Heretofore, commercial aviation in the United States has been confined largely to the airmail service. It is believed that inauguration of Western Air Express's model airline will arouse popular interest to such an extent by its success that other lines will be undertaken.

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This Business of Flying

"Where Can I Get a Good Pilot?

By Left Wing Low

Wherever I go I hear the cry and wish I could tell them. Years ago, Uncle Sam turned out pilots faster than a sausage factory makes dogs, but at last they have gone back to the farm, law practice, or selling bonds, being unable to make a living hedge hopping and cracking up Jennies, so today only a few remain who have weathered the lean years in the industry.

These boys who remain write their own ticket and fly equipment that would make a Jennie look like a hay rack compared to a Rolls-Royce. They know their stuff—day or night, rain or shine, makes no difference. They are on the job ready to push a machine through the sky.

Let's go back a bit and see what these fellows are made of. Our first flyers could not take lengthy courses of instruction, but learned to fly with painstaking effort at sun-up or sundown, when there was no wind. They would step into the machine and if the engine could be made to run, they would taxi the machine over the field, trying to keep the machine straight. This was called "grass cutting" and after hours of such practice, they took their first hop which usually consisted of a couple of hundred feet and after this had been repeated a few hundred times, they would attempt to get up and circle the field which was usually the most eventful day in the pilot's life, after which fly he was considered a full fledged pilot.

However, the machines those days had a top speed of about 60 miles an hour and would wallow around the sky usually about 35 to 40 miles an hour and when I say "wallow," I mean exactly that because they were slow on controls and the machines were as temperamental as opera singers with a cough. With the advent of larger and faster machines, having a capacity of two, the hazards of instruction were somewhat eliminated by giving dual instruction, which is still in common practice.

In 1917, when Uncle Sam joined the "Big Parade," it was decided that he needed aeroplane pilots and proceeded to make them. His requirements to take this course of instruction were that a man have a university degree or the equivalent thereof and it finally simmered down to accepting those who had at least two years of university training. With these requirements, needless to say, a very high type of individual was attracted to the flying service and while instruction was given in a very hasty fashion, there is no doubt that they learned to fly. They either flew or pushed daisies. This, in itself, was a process of elimination and survival of the fittest.

With Lindbergh's flight came new interest in aviation and it has attracted men from every walk of life. Hundreds and literally thousands now demand flying instructions, and many apparently have little patience and the foresightedness necessary to go very far in any walk of life. It takes four years of apprenticeship to make a carpenter, plumber, plasterer, brick-layer, or what have you, but many of the young men of today expect to take about three months of flying instruction. After this they believe they are qualified to fly the mail or take any of the numerous positions now occupied by the men in the industry who have been through the school of hard knocks pushing Uncle Sam's flying coffins through the sky for years and weathering the lean years, oftentimes sacrificing many good meals a week If it had not been for the love of the game, they would never have put up with the inconvenience. This is to say nothing of the foundation education which they had received prior to taking flying instruction.

The demands of the Bureau of Aeronautics for the licensing of pilots is principally for the protection of the citizens of the country, but it also proves a great benefit to the pilot who is assured of being protected against the so-called "cub pilots" ousting them

from their rightful position. If young fellows considering entering the flying field would only stop and consider the fact that air travel and transport with its many ramifications is no less an intricate method of transport than railroading, in which, to become an engineer, some twelve years of apprenticeship is required. While a pilot of an aeroplane has a greater earning power and a higher general social standing, why should it be thought possible to become accomplished in this art without considerable boning on the part of the student and much hard work over a period of several years?

Last, but not least, let us keep in mind that one can build machines far faster than they can make pilots and that while it is said that good pilots are born and not made, they are very much like any other kind of insect—there always has and there always will be—good, bad and indifferent pilots. So, let it herewith be resolved that any young man contemplating flying instructions will not expect, after three months of schooling, to be as proficient as the bird and upon entering the field, be prepared to withstand the school of hard knocks, which is found in the aircraft industry as well as in any other walk of life. Read and digest Colonel Lindbergh's experiences from university to trans-Atlantic pilot, which illustrates that WE win.

LEFT WING LOW.

New Washington Club

The Longview Aero Club, Longview, Wash., has filed incorporation papers. Directors are C. Y. Bowers, Fred Hess, Jack Manning, H. L. Beverly and Joe Ables. Ables was elected president and Manning secretary treasurer. The club contemplates buying an instruction plane as soon as a suitable landing field is provided.

Montreal Flying Club

Aviation is becoming so popular in Montreal, that a light airplane club has been inaugurated there, with two classes of members, "flying" and "non-flying" and with provision for the members of the latter class to graduate into the former.

For a start the Dominion government has put at the disposal of the club the government flying ground site at St. Hubert, Que., and offered to erect a hangar. When the club becomes prosperous, they propose to erect a clubhouse. In addition to a main hangar, the club is to erect four small hangars to be rented to private plane owners, and to employ an instructor to teach members how to fly. They will also employ a staff of mechanics and engineers. Flying members, and non-flying members if accompanied by an instructor or other competent aviator, can hire machines from the club at $5 an hour. A third class of member will be opened as soon as the club grounds and hangars are installed and equipped, namely, student-members who join the club for the purpose of learning to fly and becoming flying members.

Capt. W. S. Lighthall, a well known Canadian aviator, is president of the new club. The remainder of the officers are men of considerable flying experience.

Austrians Start Society

An Austrian Aviation Association has been formed in Vienna to further the interests and development of aviation. It is called the Oesterreichische Fluggesellschaft. To enable high school and other students to join, the membership fee has been placed comparatively low.

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"Baby" Airports for Small Communities

By John P. G. McPhee

Chairman, Committee on Municipal Airports, N. Y. State Ch. of Com. Secretaries' Ass'n.

MUCH impetus has been given commercial aviation by the recent trans-oceanic flights, and a great deal of enthusiasm has been aroused in cities and villages all over the United States for the construction of airports and the marking, or "sign-posting" of prominent buildings. Not a day passes but articles appear in the newspapers commenting on the proposed construction of the latest thing in airports, costing so many thousand dollars, etc., and, no doubt, the smaller communities are inclined to let it rest at that, little thinking that a landing field, or, if you will, "baby" airport in their community can be just as important in its own way as the larger ones in the richer and more important cities. Every city should have its landing field, and its buildings sign-posted with the name of the community, etc., and the time will not be long in coming when those communities which have paid no heed to the latest American industry will be considered a back number. The requirements of a "baby" airport, as I call it, are not complicated, and any community, however small, which has a Chamber of Commerce, Service Club, or other progressive civic body, can do all that is necessary at little expense, other than the purchase or lease of the field. I have known of cases where the property owners have been only too glad to have aerial visitors land on their fields, and in such cases all that has been necessary was the proper markings and the erection of a suitable wind indicator.

The following pointers are for the assistance of those far-sighted small communities who believe in the future of aviation. The field selected should be located on, or near, a main highway, as close as possible to the center of the community.

The ideal field is, naturally, square, although other shapes such as "L," "T" or "X" are suitable. The runway, *should* it be just a two-way field, should have a length of at least 1,500 feet in the direction of the prevailing wind. If there is more than one runway available, they should all be between 1,500 and 2,000 feet in length, although I have seen community fields with runways of 900 feet with no obstructions in the approach of landing, which are serviceable. These runways should not be less than 100 feet wide, but in the case of a field with just the one runway, the entire width of the field should on no account be less than 450 feet. The direction of the prevailing wind in the locality is very important and should not be lost sight of when selecting the field.

Obstructions must be taken into consideration and are also very important, and where possible, should be cut down or removed to a safer distance from the field. Obstructions surrounding the field not only are dangerous, but

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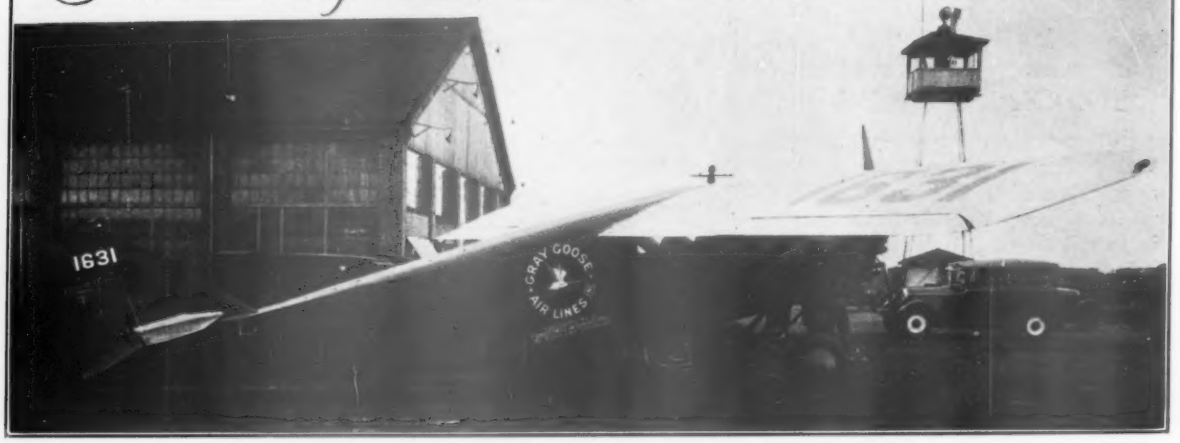

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shorten the length of the runways; for example, let us suppose that there is an obstruction 50 feet high at the beginning of a runway, and that an aeroplane landing from that direction has a gliding angle of one in seven feet, in other words, it loses one foot altitude for every seven feet traveled in the direction of flight, to miss the obstruction and pass directly over it and maintain its gliding angle, 350 feet would be lost from the length of the runway, therefore, a runway of 2,000 feet would, in reality, be only 1,650 feet. The surrounding territory should also be taken into consideration, sufficient fields should be nearby where an airplane can get down should the engine cut after taking off before a safe altitude has been obtained and where it is impossible to make a turn to get back into the landing field proper. Fields should be as level as possible, and particular attention be paid to dead furrows, ditches, rocks and other irregularities which would be hazardous to landing aircraft. Drainage is also something that should not be lost sight of, take-offs could not be made on muddy fields. Smooth, hard sod is by far the best landing surface and crops, such as clover, should not be allowed to grow over a foot before cutting. Many accidents are on record caused through the fouling of the landing gear by crops.

For daylight flying (it is assumed that the small communities would have no immediate interest in night flying), a marker is placed in the field at the intersection for the runway or runways. This marker can be easily made and consists of a circle 50 to 100 feet in diameter with a five-foot band of crushed rock laid flush with the ground and whitewashed. This can be picked up from a great distance in clear weather. It is preferable, also, to indicate the runways by strips 5 feet wide by 20 feet long, laid normal to the ground circle. A wind cone or "sock" should be mounted on a swivel bracket on a pole or corner of a building nearby, so that approaching airmen have an unobstructed view of it from all directions. This can be purchased from any dealer in aircraft and airport supplies, or could be made by any person with ordinary intelligence.

Now comes the subject of sign-posting. There is absolutely no reason why any community, however small, should not have the name of the community painted on a building. This not only helps to identify the place, but should be looked on as a duty and a safety feature that the traveling airmen will appreciate. The writer painted the name of his village on the roof of an hotel in three hours at a total cost of $6 for paint. It is true that it was not an elegant work of art, but altitude covers many sins, and in this case the name stands out splendidly from 500 to 3,000 feet and the imperfections are unnoticeable. The roofs should be of tin, slate, shingle or other metal. A simple block letter in chrome yellow with a dull black background is recommended. If the roof slopes over 50 degrees both sides should be painted. The width of the letters should be equal to two-thirds of the height. Spacing one-fourth of the height of letters. Letters should on no account be less than nine feet in height. If there is a landing field, an arrow 5 feet wide by 30 feet long should be painted, pointing in the direction of the field. If you have some paint left over, it is not a bad idea to paint four or eight points of the compass on a nearby roof. This will be of great assistance to an airman in checking up on his course, particularly should he be at all uncertain of his bearings.

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Knoxville Model Squadron

FOLLOWING tables of organization as laid down for the U. S. Army Air Corps, model enthusiasts on the Knoxville playgrounds have organized under the name of the "Knoxville Miniature Aero Squadron." Burton Simcox, a playground junior, who represented Knoxville at the National Tournament, was elected major.

For purposes of intramural competition the squadron is divided into "A" and "B" flights. Each month there is an inter-flight contest and the flight piling up the most points is allowed to name the major for the ensuing month. Other officers are appointed, the appointment being based on performance in the monthly meet.

This month the squadron is working on a small indoor tractor called the "Humming Bird." The contestants in the monthly contest will be required to fly a plane of "Humming Bird" specifications three ways, viz., hand launched, rise off the ground and rise off the water.

In addition to the monthly contests, members of the squadron may qualify for their wings and get the rating of "Miniature Airplane Pilot" in three degrees. The tests for these ratings follow:

FIRST TEST—Bronze Wings.

(a) Construct a box kite, French Army (Coyne) kite or tetrahedral kite capable of steady sustained flight for ten minutes.

(b) Construct a glider capable of a straight-away flight of 100 feet withing an arc of 30 degrees.

(c) Construct a model airplane carrying its own power, capable of flying 150 feet in distance or ten seconds in duration.

SECOND TEST—Silver Wings. (In addition to satisfying the requirements of the first test.)

(a) Construct a model airplane capable of a 200-foot flight in distance or 15 seconds in duration.

(b) Construct a balloon, hot air or gas, capable of a sustained flight of five minutes.

(c) Build a model airplane capable of flying 35 feet a second in still air. This speed plane must fly at least 100 feet.

THIRD TEST—Gold Wings. (In addition to statisfying the requirements of the first and second tests.)

(a) Distance and duration model: Must fly 500 feet or 30 seconds.

(b) Speed model: Must fly 40 feet a second.

(c) Commercial model: Build a commercial model capable of flying 100 feet in distance or 10 seconds in duration.

A rookie in the squadron who has not built a flying model is known as a "Kiwi" (pronounced "Keewee").

Some of the members of the club have been invited to fly their models before the science club of the high school.

At the weekly meetings of the club instructions are given for the building of various models, and local aviators are invited to talk about ærodynamics and simple flight problems. The squadron is now sponsoring a course of instruction for the Boy Scout Merit Badge in Aviation.

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Book Reviews

Modern Flight, by Cloyd Clevenger: This is a manual of practical flying in such terms that the layman can understand it without constant reference to a glossary of technical terms. Naturally a man with the experience of Mr. Clevenger, who has had over 4,000 hours in the air, would understand his subject, but not many practical flyers have the ability to explain in such detail and with such clearness the rather technical subjects that are handled. The booklet sets forth clearly and simply every maneuver and attitude of an airplane, with clear instructions for both cause and recovery to normal. Those planning any type of aviation course will find their preliminary work simplified to a great extent by the use of this booklet.

Aviation Trouble Chart, by Victor W. Page: A full poster-sized illustrated chart showing a large cut-away motor, with all parts shown in detail. The sources of trouble are classified, such as Lost Power and Overheating, Noisy Operation, Valve Timing, Defects in Cooling System, "Skipping," and the like, and under each classification is a tabular arrangement with information under the headings: Part Affected, Nature of Trouble, Symptoms and Effect, and Remedy. Comprehensive to the last degree and not hard to understand.

The A. B. C. of Aviation, by Victor W. Page: Although first published in 1919 the technical matter in Page's book still stands as authoritative. The chapter headings give an idea of the comprehensive nature of the treatment in this text book for school or home study. The subjects covered are Aircraft Types, Lighter-than-Air Craft, Early Airplanes and General Design Considerations, Design and Construction of Aerofoils, Arrangement, Bracing and Construction of Wings, Fuselage Construction, Airplane Power

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Plants, Propeller Construction and Action, Equilibrium and Control Principles, Rigging and Inspection.

Few of the chapters contain matter that is out of date, although developments of the past few years would make additions to three of the chapters desirable. Students should not overlook this work.

Aviation Engines, by Victor W. Page: Another product of the war school, but still full of technical material of great value to the student who wishes a comprehensive knowledge of all types of engines. The book was prepared primarily for instruction. It is, in effect, a series of practical lessons for those who wish to understand the operation and repair of aircraft power plants. Not out of date by any means, but a primary course of instruction of great utility to mechanics. Many of the engines described in detail are still in common use as aircraft power plants.

Learning to Fly in the U. S. Army, by E. N. Fales: A simple little manual for the student to follow. It omits many technical details without sacrificing either accuracy or clearness, presenting the main principles of flght, and sufficient practical information to enable the student to understand how airplanes are flown, rigged and conditioned.

Civil Aviation: This book is the publication of the report made by the joint committee on Civil Aviation of the U. S. Department of Commerce and the American Engineering Council. This committee made a most thorough survey of the aviation situation in this country and abroad and in this report presents all the facts gathered together with their recommendations to the United States Department of Commerce. It covers the field of civil aviation with particular reference to industrial applications of air transportation, traffic conditions, safety and reliability, and investment aspects. To the thoughtful student of air transport it presents material for intensive study of aviation as a business.

Airplane Design & Construction, by Ottorino Pomilio: Primarily intended for designers Pomilio's work takes the advanced student further into construction and design than any course now available. The elements of aerodynamics are gone into only enough to show the application of theory to structure and design. The book is divided into four parts, the first dealing with Structure, the next with the Airplane in Flight, the third with the Efficiency of the Airplane and the last section with Design. Drawings, tabular matter and graphic charts are used to illustrate the data given. It is a book for careful study as it represents the practical application of aerodynamical research to practical airplane design.

Aerodynamics, by Edward P. Warner: Aerodynamics is a strictly technical book for the advanced student and deals with purely theoretical and engineering matters. It is the latest and probably the most comprehensive work on this subject. Mr. Warner, who is now Assistant Secretary of the Navy for Aeronautics, takes up in turn, after a brief discussion of general principles, the question of airfoils, performance calculations, stability, controllability and other characteristics of airplanes in flight. A comprehensive knowledge of mathematics is not necessary in the student of this work, as the formulae given are all explained and can be followed easily. Actually the book, while appearing somewhat formidable in size, takes the place of a small library, as Mr. Warner has col-

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lated material from many sources and eliminated much matter of doubtful value.

The Airplane Engine, by Lionel S. Marks: The material used in this work of Professor Marks is chiefly the result of exhaustive research analysis carried on the latter years of the war by the allied governments, and covers the field of airplane engines, particularly with reference to foreign power plants. Every detail and auxiliary of power plants for airplanes is taken up and discussed with especial reference to actual performance. Detailed drawings are given of practically all the existing engines of the time, with performance data that serve as a basis for the calculations made. The language is not too technical for ready reading, even by the student who is not far advanced.

The Airplane of the Future

By Alexander Klemin

PREDICTION in engineering matters is always dangerous, because at any moment the course of normal progress may be revolutionized by some outstanding discovery or invention. This is particularly true of airplane construction which is a comparatively new art.

The airplane is still associated in our minds with wood as the main component of the structure, with linen or fabric as the outer covering. The history of ships and of automobiles, and all present indications in airplane design, lead to the conviction that the airplane of the future will be entirely of metal, either steel, duralumin or a similar light alloy, and that its imperviousness to weather and its usable term of service will be very greatly lengthened thereby.

The fire hazard in aviation has been already greatly reduced. It will disappear almost entirely by the development of light aero engines burning a cheap and non-inflammable heavy oil fuel, and by the provision of exhaust stacks or pipes which shall be so cooled by the rush of air that no potentially dangerous "hot spots" remain.

Since the wonderful transatlantic flights of Lindbergh, Chamberlin, and Byrd, aviation enthusiasm in the United States has reached fever pitch, and the rapidity with which numberless airports and landing fields are being constructed and planned is extraordinary. Nevertheless we must have complete security of the power plant. The aero engine of the future will be air-cooled, eliminating all radiator or plumbing troubles. The power plant will be multiple unit, so that if one or more engines go out of commission it will be possible to continue flight with perfect security, and to make necessary engine repairs or adjustments in the air.

The fundamental aerodynamic characteristics of the airplane may not change, but there will most certainly be progress on the lines of increased safety. Planes will land at thiry miles an hour instead of some fifty miles an hour, as at present.

The Daniel Guggenheim Safe Aircraft Competition, with $100,000 as its major prize, will do much to secure these slow landing characteristics in commercial airplanes. It may also produce aircraft having far greater stability than at present. We may look forward to the day when no matter how unexpectedly the engine fails, the plane will take up a steady and safe glide towards the ground; no matter what abnormal attitude the plane may assume, it will rapidly regain an even

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keel; no matter how gusty or foggy the weather, the commercial plane will fly with perfect stability.

The power of an aircraft engine diminishes with the rarer atmosphere of great heights. But if the air is suitably compressed, or the engine "supercharged," its power may be maintained, and we then have the paradoxical fact that the higher the airplane flies, the faster it flies. We can conceive of a plane with supercharged engine, and an air-tight passenger compartment suitably heated and supplied with air at normal pressure, flying at 30,000 feet above sea level at 300 miles per hour. A ten-hour trip from New York to San Francisco may be within reach of the busy merchant prince.

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Questions & Answers

Popular Aviation will endeavor to answer all questions of general interest pertaining to aviation in this department. If personal answers are required please send the Editor a stamped and addressed envelope.

Q: Can you tell me where I can buy "solo" time? I want to pile up some hours to get my license.

Wallie, Chicago.

A: Buying solo time, so to speak, is in great demand and no doubt the best place to secure this would be from the nearest school. The time may be purchased from $20.00 to $35.00 an hour, depending upon the proficiency of the "Cub Pilot" which is determined by the chief pilot of the organization. In some cases they require a bond to offset any damages which may take place and in the event of cross-country time over night a charge is made for waiting time elapsed. We suggest you take this up with the schools who will accept or reject your application, depending upon how they are fixed for equipment.

Q: They tell me I must have 50 hours before I can get a license. Is that right. What is the best way to get a club started?—L. M. B., St. Louis.

A: Right, 50 hours for a license. Read Mr. Hill's article in the October issue of POPULAR AVIATION.

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Canard Type Revived

The Focke-Wulf Company of Germany has revived the old French Canard, or Duck, type of plane with essential modifications. The wing is behind the pilot's seat, and carries two 75 horse power engines, one on each wing. The fin is exceptionally large and the rudder comparatively small. The stablizer and elevators are in front of the pilot's seat. The wings are fitted with regular ailerons. The Canard type is an easily handled machine of great stability, and will take off with a comparatively short run.

The new Focke-Wulf duck type monoplane. Guess which end is which.

Starting from his regular headquarters at Rankin Field near Portland, Oregon, Tex Rankin flying a Waco nine ninety H.P. biplane and carrying a full load broke the National altitude record for OX5 planes when he reached an altitude of 12,300 feet. He reported they could have undoubtedly made at least another 500 feet had not the extreme cold forced him and two observers down. The estimated temperature at that height was estimated at twenty below zero. The figure was checked by Lawrence Therkelsen of Portland, Oregon, representative for the National Aeronautical association.

It required ninety minutes to make the upward flight but only twenty for the return. The total weight carried on the trip was 762 pounds. Rankin had anticipated making a gliding record on his trip back to earth but was deterred on account of extreme cold.

Power Line Inspection

A German public service company was compelled to inspect its power line, due to trouble. An airplane was chartered and within 2½ hours the distance of 400 to 500 km. had been covered, in a country which could be reached with difficulty by automobile. The airplane flew about 17 ft. above the transmission line and dropped reports placed in bags near the high voltage control stations.

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Civil Air Corps

The Civil Air Corps association in its recent executive Council meeting, adopted a resolution creating the first National Administrative Board, and electing some nationally prominent leaders who since have accepted office including a past Supreme Dictator of the L. O. O. Moose, a former Chief of Aircraft Disposal of the U. S., financial men, and corporation and club officials.

This move was necessary as the plan of Free Aviation Training Clubs, and its Training Corps system, attracted such favorable support from young men and women who desired to learn the whys and wherefore of aviation so as to be able intelligently to assist in pushing aviation matters forward in their city, as well as perfect themselves for an opportunity in this new rising industry. It also enlisted the active membership and interest of municipal officials, club and flying company officials who realized that it was a movement that was wholly beneficial and practical, in which they could become leaders and could give it their entire support.

Without having any paid officials, the merit of the movement spread to four states, making a larger program necessary. With this the governing body was expanded to include representative committees of Chamber of Commerce officials, Civic Clubs, Rotary, American Legion, Women's Clubs, thereby actually turning the control over to the representative civic and business leaders in the several communities.

A further resolution was adopted looking forward to the necessity of appointing a regular executive secretary, also moving the central headquarters to a central Michigan City from Detroit where the Central Secretary's office is temporarily located.

As Chief instructor, or Senior "commander" of Training Corps units —that is free training clubs—Mr. John Whitney Dissette, of Illinois, formerly of Washington, was unanimously chosen. Mr. Dissette was an early flying Captain, engineer, and author of some official text books in connection with aeronautics, and a popular and recognized leader in aviation matters throughout the United States. Paul Richter, a pioneer in civilian aviation development was chosen chairman of the Board of Officers, that is—Instructors, and a concise system of twenty lessons have been developed that are fitted to both young men as well as city officials who wish to become airwise.

A Michigan state conference was held at Saginaw not long ago where representative officials from numerous cities were present and conducted a most enthusiastic valuable session.

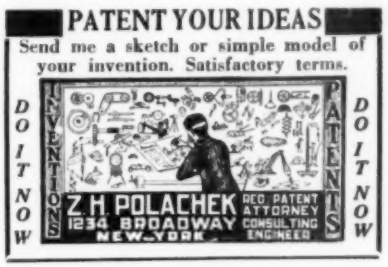
In its recent executive Board meeting an educational aviation competition was approved, which when used to its fullest extent will prove a valuable aid in developing practical aviation interest.

The Board of Staff Officers (volunteer instructors) includes American citizens formerly from the Army, Navy and Marine corps, also from the Royal Air Force (British), the German, the Swiss and the Italian flying forces who are joining hands as Americans for the true sport and progress of America First in the Air.

Executive offices were established on the eighth floor of the Washington Boulevard Building, Detroit, Michigan,—and branches will soon be announced for Ohio, Texas, Illinois and California, where members of the Administrative Board are contributing their services to this cause.

Junk Old Planes

Junking of the present airplanes at Sand Point field, Seattle, Wash., and replacing those of obsolete types with modern standard planes now in use by the U. S. Air Service is advocated by Maj. H. C. K. Muhlenberg, who will shortly take charge of the Air Corps Reserve there. First Lieut. Theo. J. Koenig, formerly in charge of the Sand Point field, has been transferred to the Crissy Field, San Francisco.



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New Aero Clubs

The following Aero Clubs have been formed recently:

Hollywood Aero Club, 1605 Cahuenga Ave., Hollywood, Calif., Roger I. Adams, president.

University Aero Club, University of California, Los Angeles, Calif.

Delaware Aeronautical Association, care of J. J. Garvin, Wilmington News and Journal, Wilmington, Del.

Colorado Springs Aero Club, Colorado Springs, Colo., Capt. Earl Zimmerman, 1401 N. Nevada Avenue.

Flying Club of Springfield, Springfield, Mass., Winsor B. Day, president, 250 Long Hill St.

Huron Valley Flying Club, Ypsilanti, Mich., E. A. Goff, Jr., manager.

Michigan Aircrafters Association, 942 Dakin St., Lansing, Mich.

Brooklyn Aero Club, 1712 W. 7th St., Brooklyn, N. Y., Irving Heartstone, president.

Aeronautics Mechanics Association of America, Curtiss Field, Garden City, L. I., New York.

Aeronautic Club, Fargo, N. D., Murray A. Baldwin, president.

Aero Club of Oregon, 421 Oregon Building, Portland, Oregon, Don S. Phillips, secretary.

Aero Club of Erie, Erie, Penna., L. G. Osborne, president.

Aero Club of Pittsburgh, 1357 Frick Bldg., Annex, R. M. Marlier, president.

Aviation Cadets of America, Oakcliffe-Dallas Commercial Association, Dallas, Texas.

Coast Defense Outpost

An aviation outpost that would protect the middle Atlantic coastline from aerial attack in event of war will be proposed to the Delaware Legislature by Governor Robinson.

The Governor's plan will provide protection for Washington, Baltimore, Philadelphia and Wilmington, together with nearby powder plants and ammunition factories, through establishment of a strong aviation base on the site of the present quarantine station below Lewes, Del., near the Delaware Breakwater.

If the outpost is established it will protect the all important navy yards at Philadelphia and Washington, the munition production plants at Sparrows Point, Baldwins, Midvale and Bethlehem, and the powder and high explosive plants of the du Ponts.

Announcing his plan, Governor Robinson said:

"I will recommend to the legislature that the quarantine station be transformed into a strong aviation outpost. We have no flying field in Delaware open to the public and it is time we did something along aeronautical lines.

"The quarantine station site at Lewes is ideally situated for use as an outpost for national defense and should be converted to that purpose. Dela-

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The Civil Air Corps Assn. is incorporated as a non-profit aviation educational, and sports, preparedness club, and was launched in 1925 BECAUSE an educational system was necessary which would aid the layman and city official to take the nonsense out of flying.

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may save $25.00 (the membership fee) by simply remitting one year's dues, $3.00, sending 2 character references. You will receive your membership and the beautiful Civil Air Corps insignia (in gilt—if you wish gold plated add 25c) and learn how to make yourself a leader and help put your city on the airmap.

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ware made the grant to the government without restrictions and it was utilized for some time as a quarantine station. Substantial brick buildings were erected, the ground was drained and leveled, and approaches to it from both land and water were improved.

"Recently, the government discontinued the station's use and refused to continue paying the cost of its maintenance. That action throws it back to Delaware. It seems to me this is good chance for the state to do something worthy toward aviation development. Under the guidance of practical experts like Colonel Charles A. Lindbergh we can construct hangars, install beacons, floodlights and other equipment which will instantly be available to the government in event of war.

"There are sixty acres available now, and property adjoining it available if more is necessary."

Opinion in Delaware is that the legislature will gladly endorse the Governor's views and take steps toward transforming the station into an aviation outpost. The small cost that would be involved because of large buildings already on the property is a strong point in the plans favor.

New England Survey

Colonel Sanford E. Thompson announced at a recent aviation dinner of the New England Council that a complete survey of the aviation industry in New England is to be undertaken by the council. The work will be done through the council's Advisory Group of Professional Research Consultants, representing every form of industrial research.

Assistant Secretary of the Navy Edward P. Warner declared before the same gathering that New England's aviation future lies in the development in that section of the seaplane industry. He said that the use of private seaplanes has dropped to almost nothing because of the lack of good commercial seaplanes today and prophesied that a profitable future awaited the manufacturer who would take up this aspect of aircraft production. Thirty airports, he said, would provide ample flying bases for Massachusetts, provided that a number of fields were cleared between bases for landing purposes.

"New England's rugged topography is likely to prove a blessing in disguise to aviation," said Secretary Warner. "There should not be a spot in New England, except in the forested areas, where a pilot need to be more than twelve miles from a possible landing place. This involves collective effort and it is not a blow to one town's leadership to have a nearby town also construct an airport. The new airport is just one more place to land. Aviation has a peculiar present day value to New England as 'the playground of the nation.' Wealthy people spend their summers in New England. They can afford the convenience of personal travel by air.

"The aviation industry is not sharply localized and will not be. Aircraft materials are light and easily transported. The finished product is bulky and cannot be shipped cheaply. New England has the skilled labor and the management for aviation production. And with her maritime traditions, seaplane production is a logical surety for the section. Inland lakes and rivers offer extensive seaplane facilities."

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(*Continued from page 24*)

by purchase, lease or otherwise and to sell or exchange, mortgage and deal in real and personal property, necessary, incidental and convenient to the main purpose of the corporation. To have the right to purchase, own and acquire any and all kinds of aeroplanes, airships, motors, parts, and accessories therefore. To have the right to create and maintain a sinking or 'crashing' fund for the purpose of meeting any obligations and debts of the corporation. To lease for hire any aeroplane owned by the corporation the proceeds therefrom to be used for the expenses of the corporation and furthering its purposes. That the pursuits of the corporation are not for profit but at the expense of the members, and to be supported by membership dues and the leasing of aeroplanes as mentioned aforesaid. To have the authority to do all things necessary and convenient to further the interests of this corporation and to carry out the general purpose for which it is organized."

First Atlantic Crossing

(*Continued from page 31*)

into fog at the low levels and massed clouds above the fog at the higher levels.

As night approached conditions became worse, the fog and clouds thickening to such an extent that all sense of direction was lost. As a matter of fact, Brown was able to take observations only four times during the entire flight. Once a spin carried them to within sight of the water from an elevation of 4,000 feet, and only the fact that the fog did not hang quite low saved them from disaster. The speed indicator ceased to work, and the small propeller operating the generator for the radio sending device was broken, and navigation became difficult to say the least. The receiving apparatus worked, but a confusion of messages prevented Brown from picking up any information of value to him.

Dawn found the plane still in the clouds, with sleet and snow becoming a real problem. An ascent to nearly 11,000 feet was succeeded by a brief glimpse of the sky and they managed to fix their position as near the Irish Coast. Descending close to the water where they found clearer air they finally came in sight of the islands of Eeshal and Turbot and a few minutes later they found themselves over the mainland. The masts of the Cliffden wireless station were sighted and they fired their Very pistols in an endeavor to receive a reply of some sort.

With a little hunting they found what appeared to be a good landing field, and nosed down to complete the journey. The smooth green field proved to be a slimy bog and the landing was anything but a success. Neither pilot nor navigator were hurt, however, and the plane was not damaged materially. Sixteen hours had elapsed since the start the previous day, which meant an average of nearly 120 miles per hour for the trip.

The plane was later sent to London, where it is now in the Science Museum at South Kensington. Naturally the enthusiasm of England was at a high pitch, for a record had been made that probably a majority of people had thought impossible. Incidentally, it may be added, this record was to stand unbroken for years and not for eight years was a serious attempt made to break it.

Plane for Business Use

The Langman Electric & Engineering Company will be the first business firm in Portland, Ore., to use an airplane in their business. The company has ordered a new Davis monoplane, delivery of which will be made early in November.

This company gets hurry-up calls frequently from outlying towns and the machine will enable them to give service to these places almost equal to that given by the firm in Portland. J. D. Langman, president of the company, was at one time an army aviator. He gives it as his opinion that there are many other firms who could use airplanes to advantage in their business.

Beg Your Pardon

Through a regrettable error last month the captions under the photographs of Mr. Brock and Mr. Schlee identified the men wrongly. If "Billy" Brock has any doubt as to how many people know him, we invite him to stop in our offices some time and inspect the multitude of letters, some of them indignant, that called our attention, over and over again, to the mistake.

Just to have it straight, let us title the above picture correctly—Mr. Edward F. Schlee, the president of the Wayco Oil Company of Detroit, is the decorated man at the left, while William S. Brock, pilot, is the smiling one at the right.

XUM

Awarded Flying Cross

Lt. Ben H. Wyatt of the aircraft squadrons, battlefleet, has been placed in a class with Comdr. Richard Byrd, Col. Charles Lindbergh and Lts. Maitland and Hegenberger, for he has been awarded the Distinguished Flying Cross by President Coolidge.

The award was made "for extraordinary achievement in aerial flight," and the four flyers mentioned are the only men who have up to this time received the cross. Lt. Wyatt's cross is still in the process of manufacture.

Lt. Wyatt was given this honor for his service in the summer of 1926 when he headed the aerial survey expedition that mapped 20,000 square miles of hitherto unmapped Alaska country. This expedition of Loening amphibian planes flew from San Diego to Alaska.

Lt. Wyatt is a flyer aboard the U. S. S. California and will soon assume command of the Sand Point flying base at Seattle. The cross, when finished, will doubtless be presented by Adm. Louis R. de Steiguer, commander-in-chief of the battle fleet.

Lieutenant Benjamin H. Wyatt, U. S. N.

Lieutenant Wyatt will be remembered as the naval officer loaned by the Government to take charge of the navigation tests of entrants for the Dole Race to Honolulu. He came in for a vast amount of undeserved criticism for his insistence upon a certain minimum amount of navigation knowledge and for his persistant efforts to prevent many of the entrants from unnecessarily risking their lives.

Flyer Receives Trophy

The Herbert Schiff Memorial Trophy has been awarded to Lieut. Arthur Gavin of the naval aircraft factory at Philadelphia, for a record of 365 flying hours. The award is made yearly to the naval or marine corps officer with the greatest number of flying hours without serious accident to personnel or material.

Winnipeg-Chicago Line

At a meeting between V. L. Roberts of Minneapolis and General J. H. McBrien of the Canadian Air League in Winnipeg negotiations were started for the establishment of an air service between Winnipeg, Minneapolis and Chicago.

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(*Continued from page 44*)

vibrations of the ship are taken care of.

A compass is subject to error and corrections must be made. The principle errors are:

1. Northerly turning error.
2. Error caused by steel parts in the aircraft itself.
3. Magnetism in the soft iron induced by the earth's magnetic field.
4. Vibration.

The principles of the earth inductor compass will not be gone into in this issue as it will be taken up later under Navigation, as well as a further discussion of the magnetic compass.

The inclinometer is frequently of one of two types, a bubble in liquid, or a steel ball in a glass tube. The principle is the same as that of a spirit level. The dropping of a wing makes the bubble or the ball move over to one side, showing the plane is inclined. By watching this instrument the pilot can keep his ship on a level keel. Inclinometers are subject to accelerations of speed and only read correctly when the plane is flying on a straight course at a uniform rate of speed.

The turn and bank indicator is a refinement of the inclinometer, as is the climb and dive indicator. The latter shows the angle at which the ship is climbing or diving. The turn and bank indicator is a combination instrument which enables the pilot to fly a straight course and to keep from turning aside in either direction.

The air distance recorder is an added feature in some airplanes and serves as an approximate record of the distance covered. It is driven by a small wind vane on one of the wings. It is naturally subject to correction on account of head, tail or cross winds. It affords a check against the reading of the air speed indicator.

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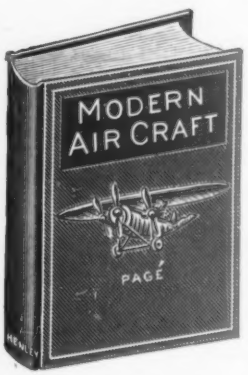

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This book describes the various types of aircraft, their construction, principles of operation and commercial applications. This work considers the elementary operating principles of both lighter-than-air and heavier-than-air craft. It shows by simple diagrams, just how any airplane flies and is controlled, outlines and describes all important parts of the plane and just what they do and how they are used. Most recent types of airplanes and airships are described and illustrated. A special chapter outlines airplane instruments and aerial navigation. Airplanes and seaplanes, including record breaking types, are shown and their characteristics and performance considered in detail. Unusual types of aircraft, such as helicopters are considered. This book covers the commercial possibilities of aircraft types, outlines their spheres of usefulness and considers the cost of flying. The equipment of airports, airways and landing fields is touched upon and a complete and easily understood semi-technical exposition of all branches of aerodynamics as well as a complete glossary of terms used in aeronautics.

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XUM

Naval Aviation Training

(*Continued from page 17*)

creased service and advancement in rank.

In requesting information regarding applications for entrance to any of the Naval Air Stations, the candidate should bear in mind several things.

First: He must be qualified from both the educational and physical standpoint. No exceptions are made. So many applications are received that the Navy has the choice of select material, so it is not necessary to reduce the requirements in order to fill the classes. In fact, the selection of candidates is on a strictly competitive basis.

Second: The selection of candidates is based on the competitive work in the ground school instruction, which covers a period of several months in the spring of each year.

Third: Until the shortage of planes can be made up it may be necessary for the student to remain in the near vicinity of the Unit for several weeks after his six weeks training has been finished. Residence near the Unit becomes almost essential.

Safe Aircraft Competition

(*Continued from page 20*)

to be gone through except that after the plane has assumed the abnormal attitude the controls are to be released and the aircraft must make recovery of its own accord with a loss of height of not over 500 feet.

Controllability Tests: With the object of illustrating that all controls are simple to understand and easy to operate and to prove that under all conditions of flight and gliding effective control is maintained, the aircraft will be required to demonstrate the effectiveness of each and all controls at any speed and at any attitude, from level to steepest gliding attitude, and at any throttle opening. Controls must not only produce but effectively correct changes in attitude, and the effectiveness of one control or combinations of two must be shown when the other control or controls are left free or held fixed.

Maneuverability Tests in Restricted Territory: To show that the aircraft can be safely maneuvered in taking off or landing in restricted territory or when taxying on the ground, the aircraft must be able to take off from and land in a plot 500 feet square, with a theoretical obstacle 25 feet high surrounding it. The airplane must show that it can be taxied under its own power in any direction in a wind of 20 miles per hour. It must also prove that it can be handled and moved by the ordinary ground personnel.

The Guggenheim Fund sensed the public demand for safety before it was formulated in protests, and the Competition is the result of a careful working out of basic safety principles that will be required by the public in airplanes.

Glider Altitude Record

Ferdinand Schultz has finally gathered in the only glider record not held by himself, by recently reaching a height of 752 meters (nearly 2,500 feet) in his gliding plane, West Prussen, at Masienburg, Germany. He stayed aloft over four hours and exceeded the former record of 650 meters held by France.

Airplane Radio Tests

The Burgess Radio Laboratory at Madison, Wisconsin, established two-way communication in short wave radio transmission on October 22 with fourteen different amateur stations. The award of the prizes offered by the laboratory is interesting in that it shows some of the distance possibilities with short wave transmission. Two amateurs in Pennsylvania received prizes for submitting a complete report of the transmission. One in New York state copied the plane signals over a distance of 725 miles.

The plane used a transmitting and receiving outfit weighing 65 pounds complete, using a trailing antenna wire 85 feet long. For two hours the plane communicated with one station after another. Lieut. H. P. Roberts of Signal Corps, Wright Field, Dayton, Ohio, communicated with the plane in both code and by voice for about ten minutes.

Arrangements are being made by the laboratory for additional tests on 20, 40 and 80-meter lengths.

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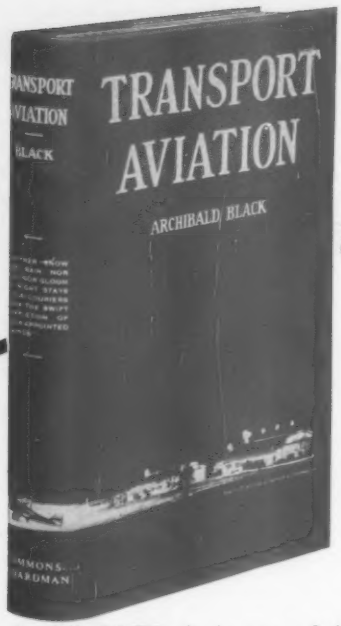

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